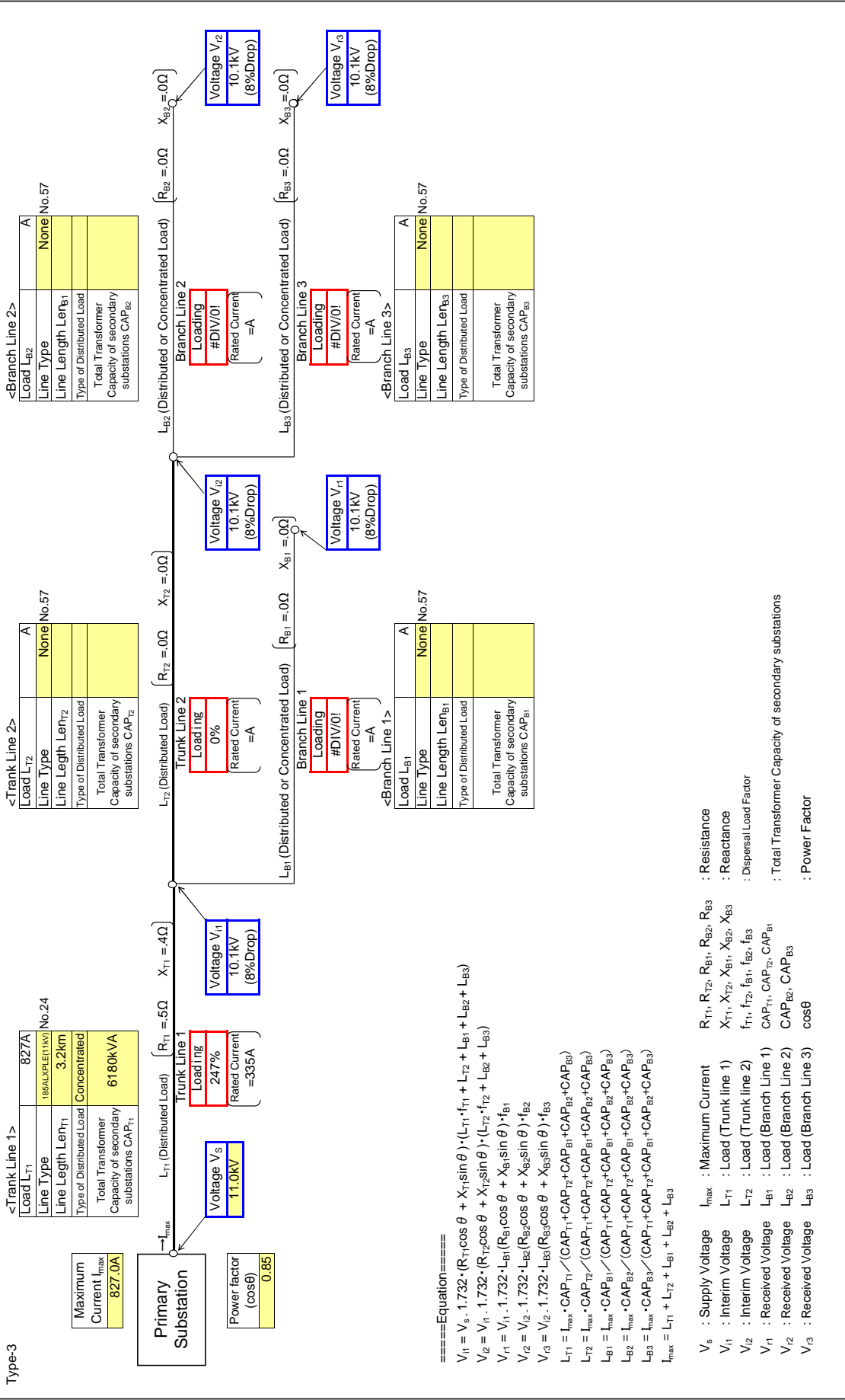


Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D16

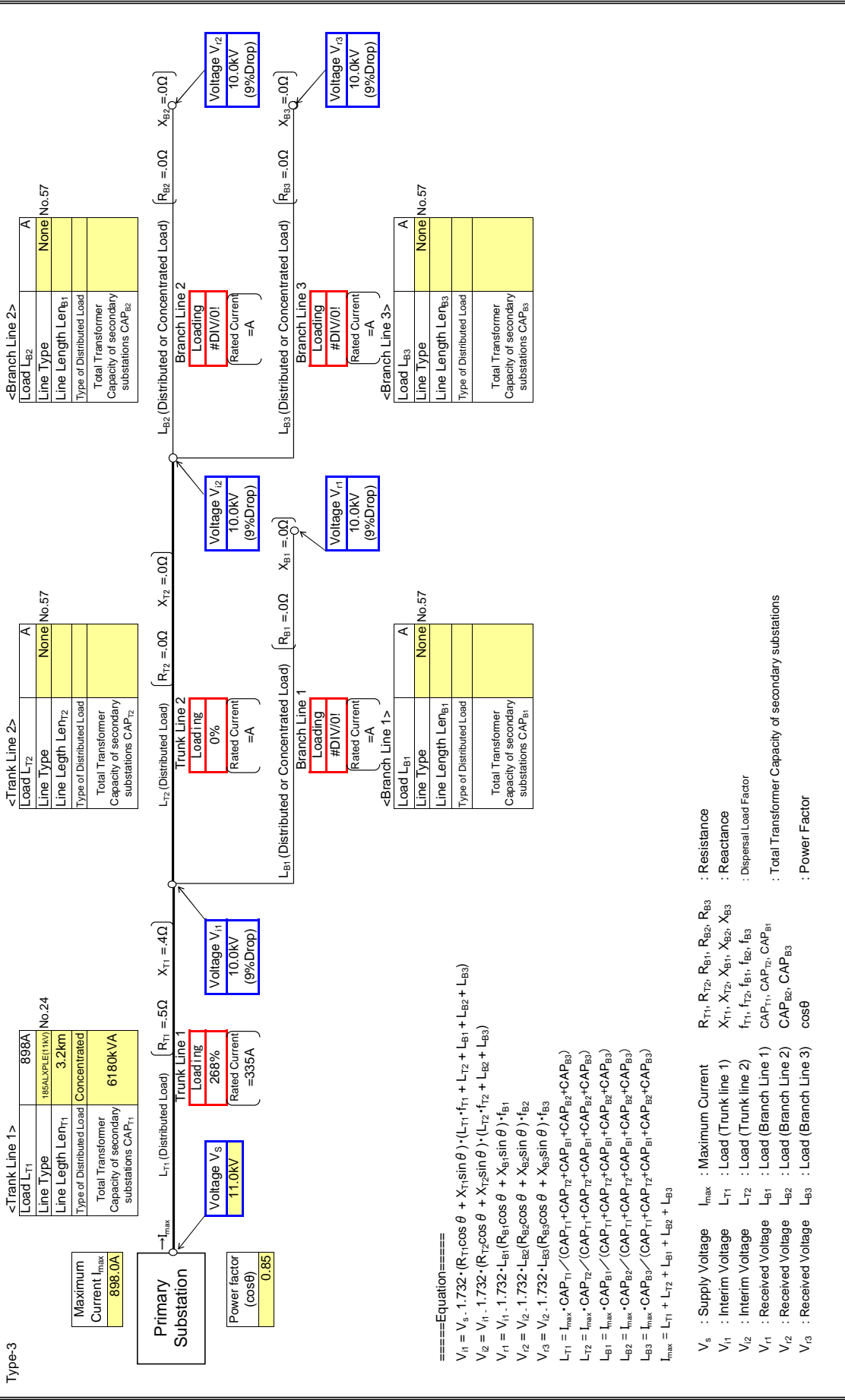
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D16

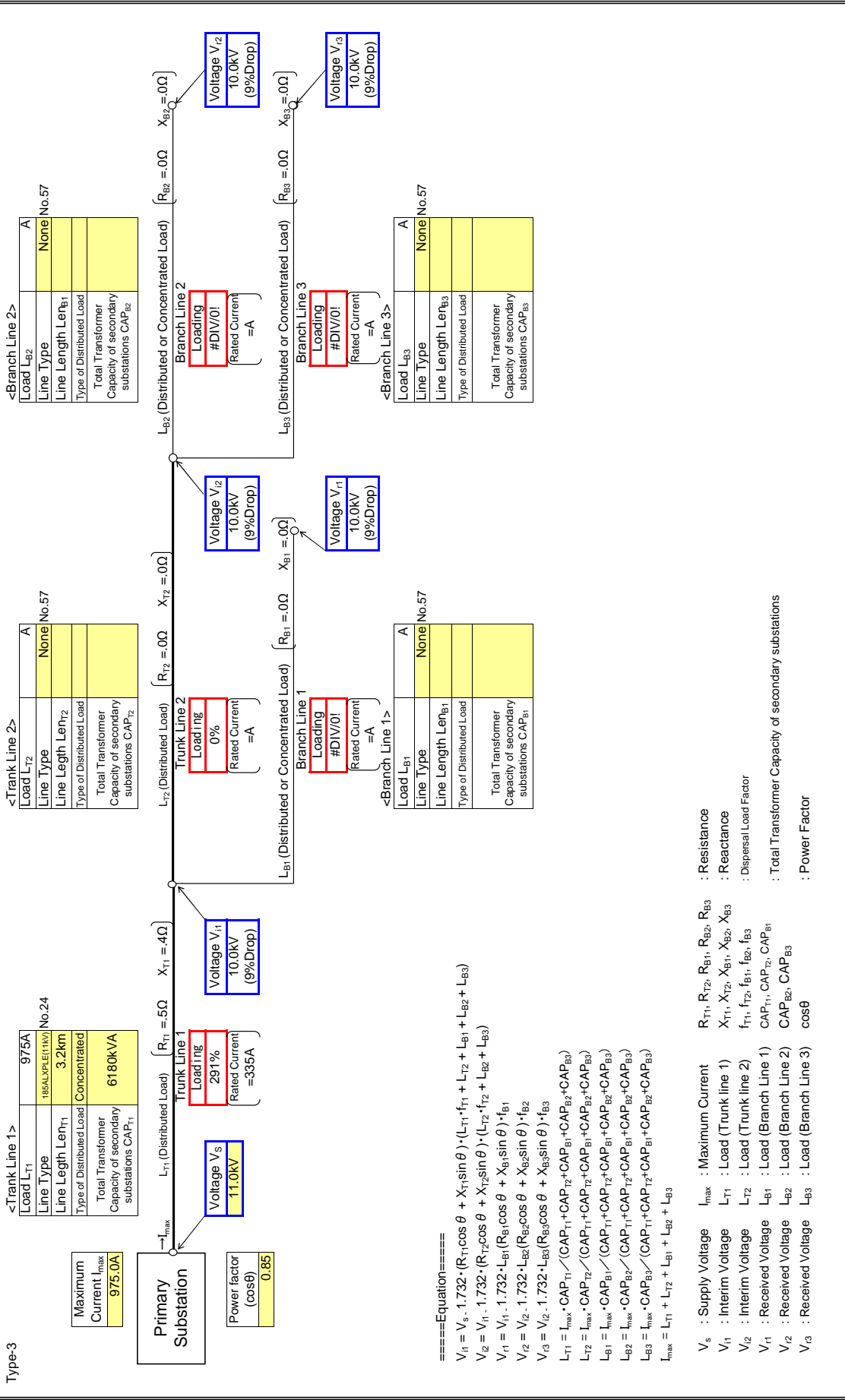
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D16

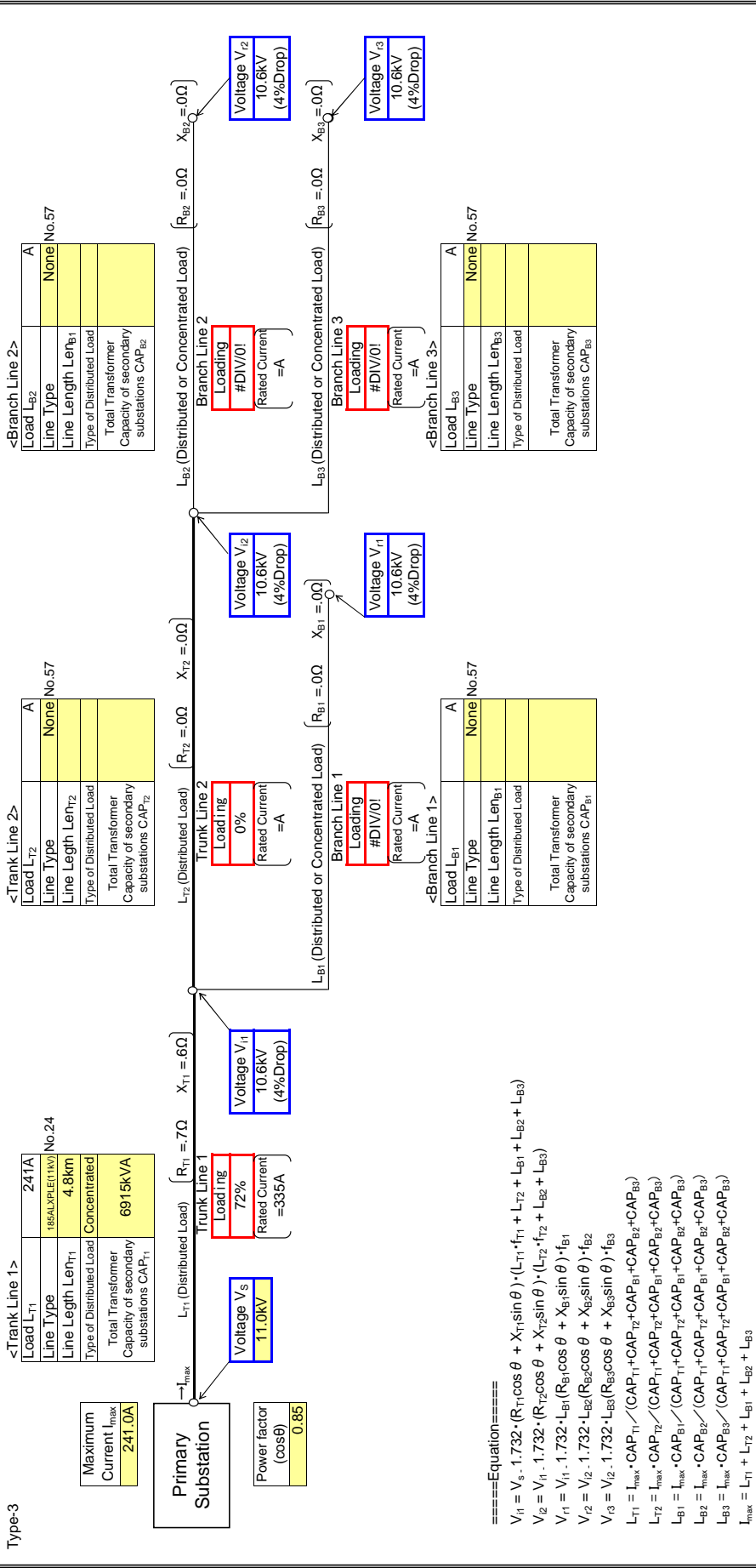
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

Input data in colored cells

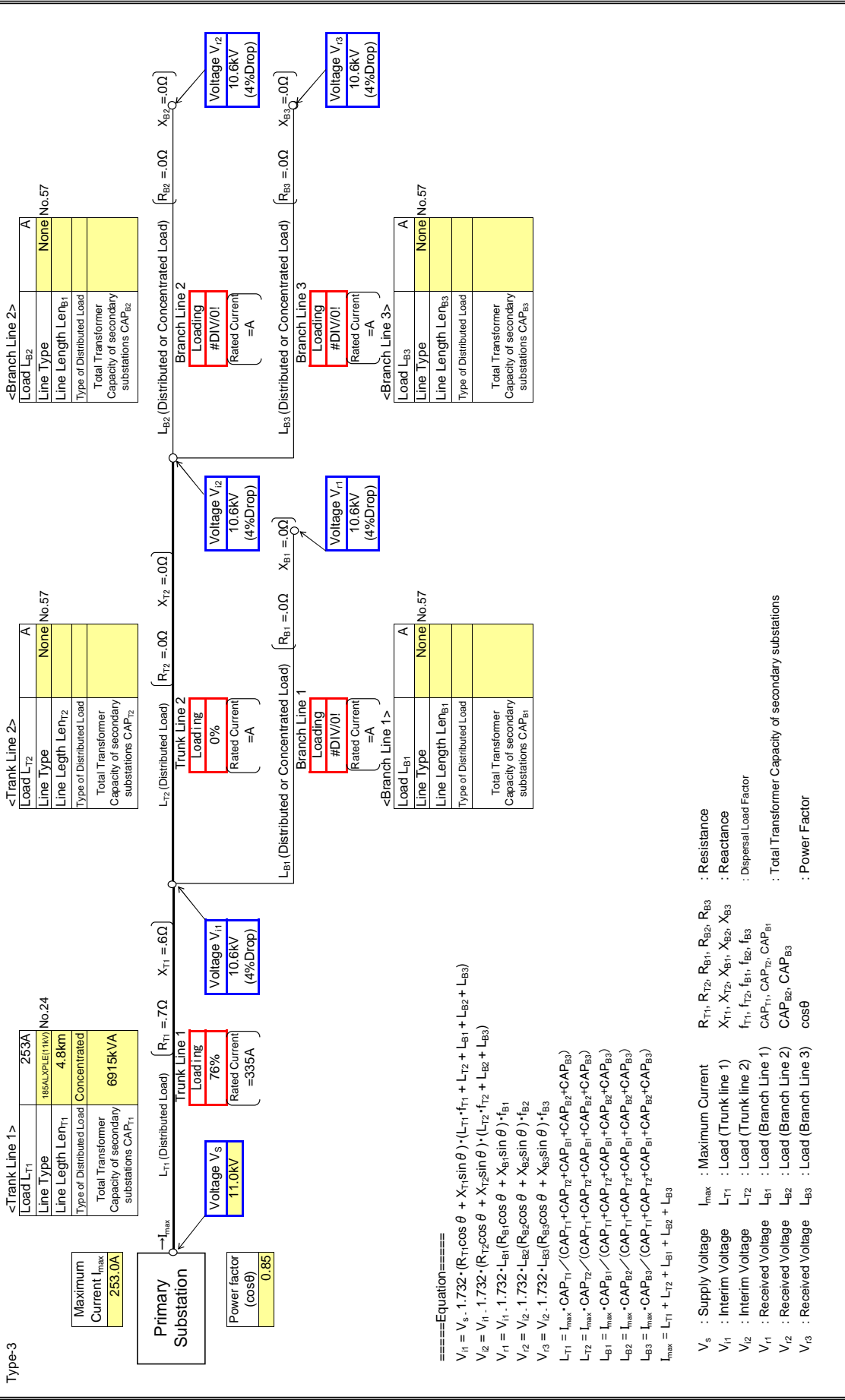


- V_s : Supply Voltage
- V_{r1} : Interim Voltage
- V_{r2} : Interim Voltage
- V_{r3} : Received Voltage
- V_{r4} : Received Voltage
- V_{r5} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

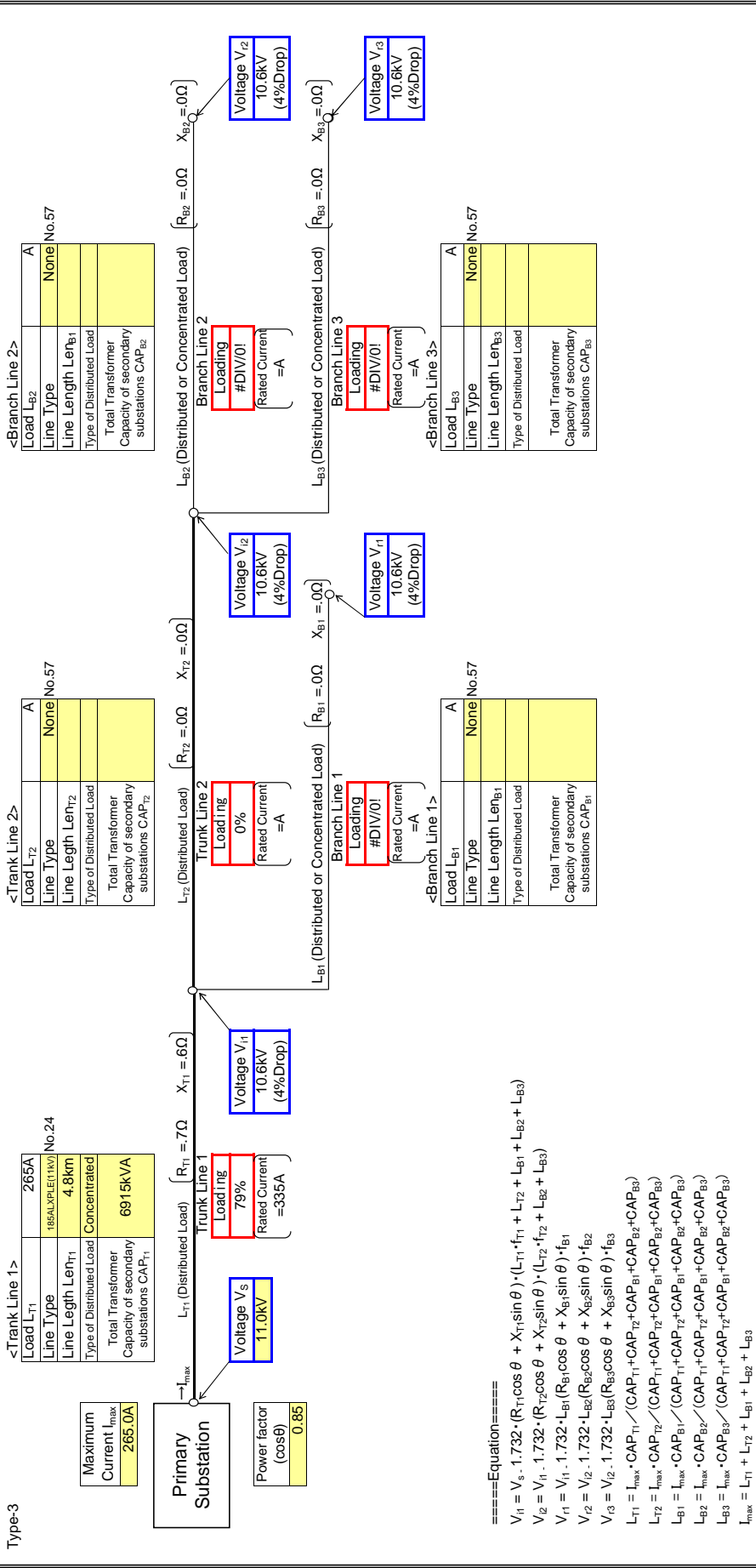
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

Input data in colored cells



====Equation====

$$V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{T2} = V_{T1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{B1} = V_{T1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{B2} = V_{T2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{B3} = V_{T3} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

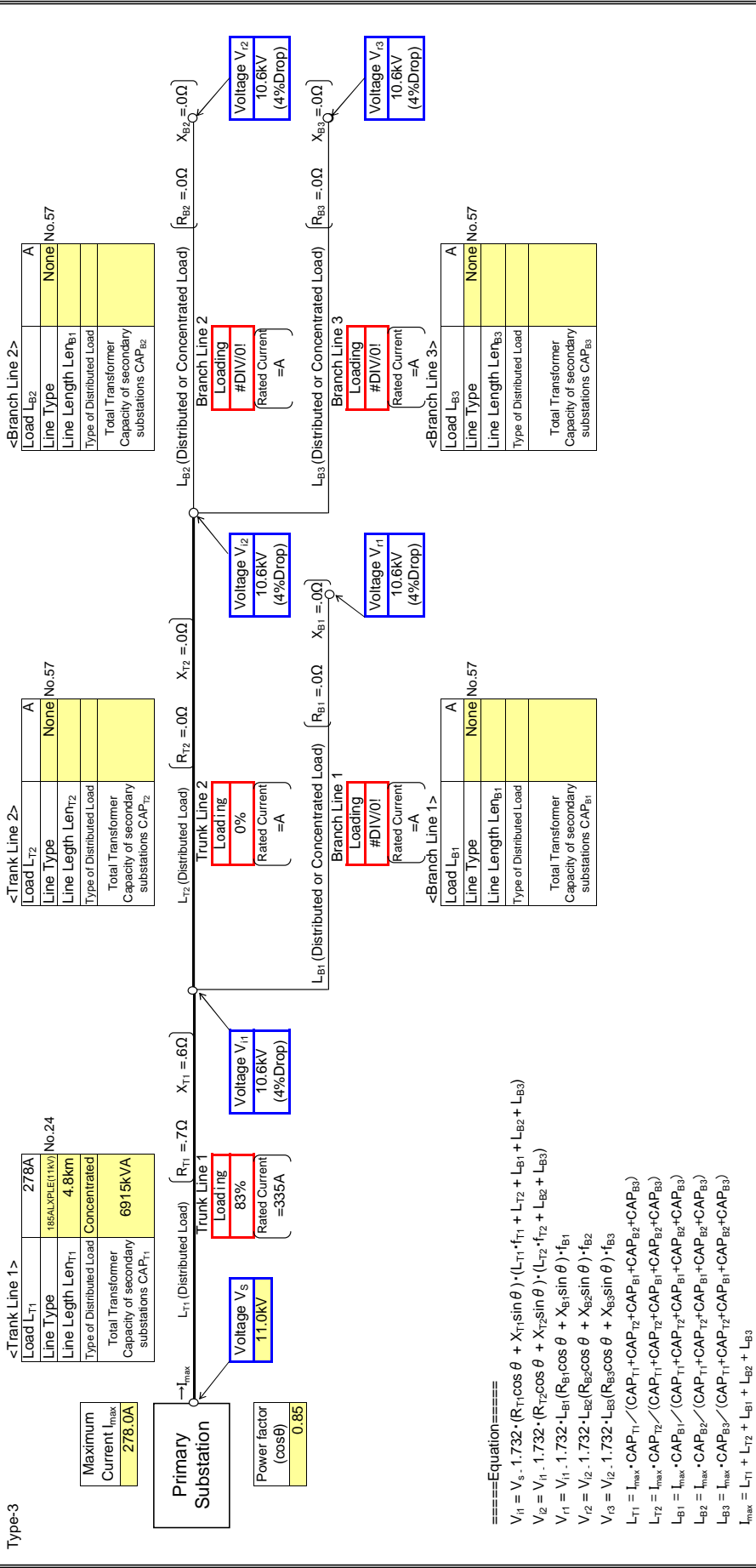
$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

V_s : Supply Voltage **I_{max} : Maximum Current** **$R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance**
 V_{T1} : Interim Voltage **L_{T1} : Load (Trunk line 1)** **$X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance**
 V_{T2} : Interim Voltage **L_{T2} : Load (Trunk line 2)** **$f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor**
 V_{B1} : Received Voltage **L_{B1} : Load (Branch Line 1)** **$CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations**
 V_{B2} : Received Voltage **L_{B2} : Load (Branch Line 2)** **CAP_{B2}, CAP_{B3} : Power Factor**
 V_{B3} : Received Voltage **L_{B3} : Load (Branch Line 3)**

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

Input data in colored cells



====Equation====

$$V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{B1} = V_{T1} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot (L_{B1} \cdot f_{B1} + L_{B2} + L_{B3})$$

$$V_{B2} = V_{T2} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{B3} = V_{T3} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

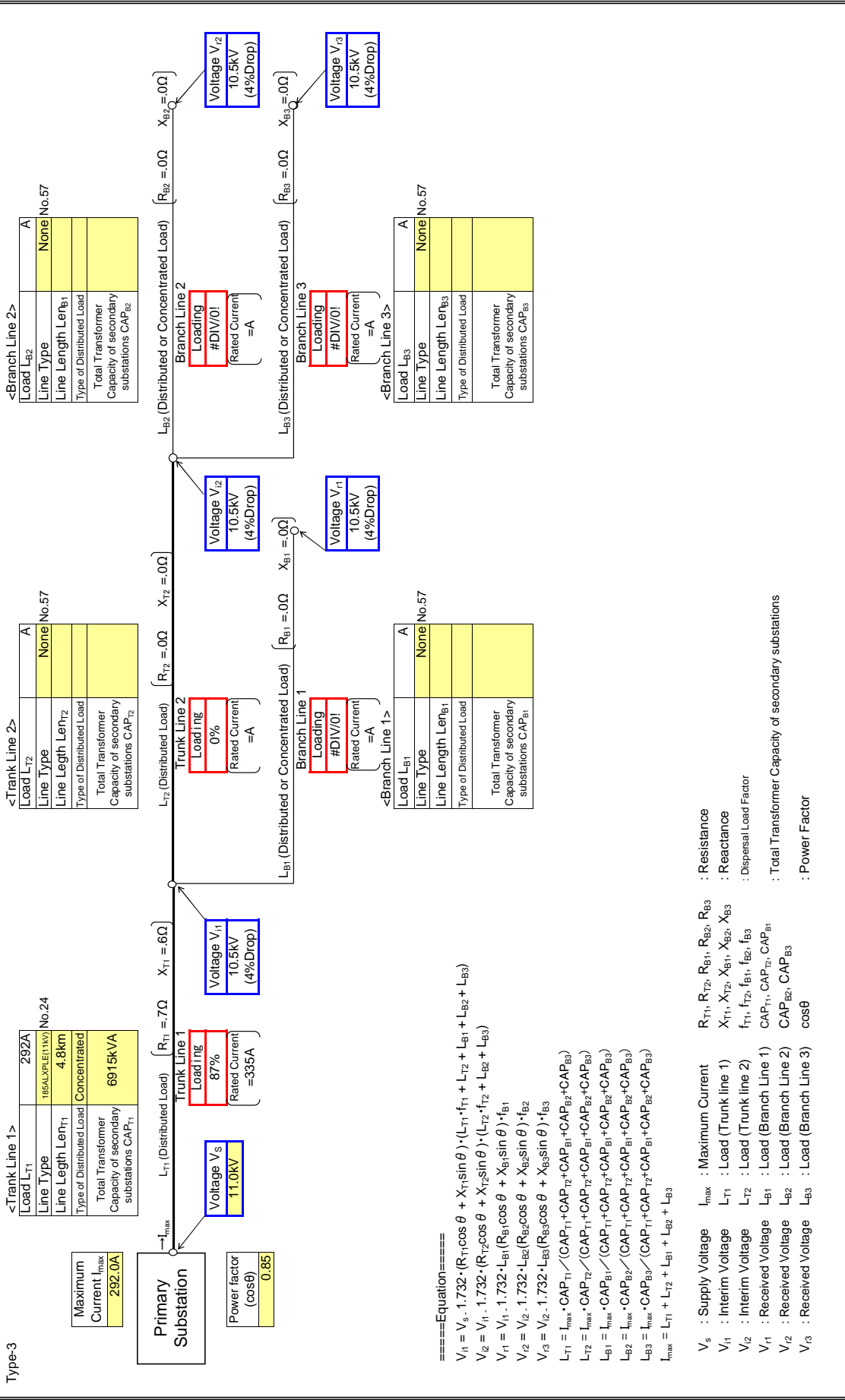
$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

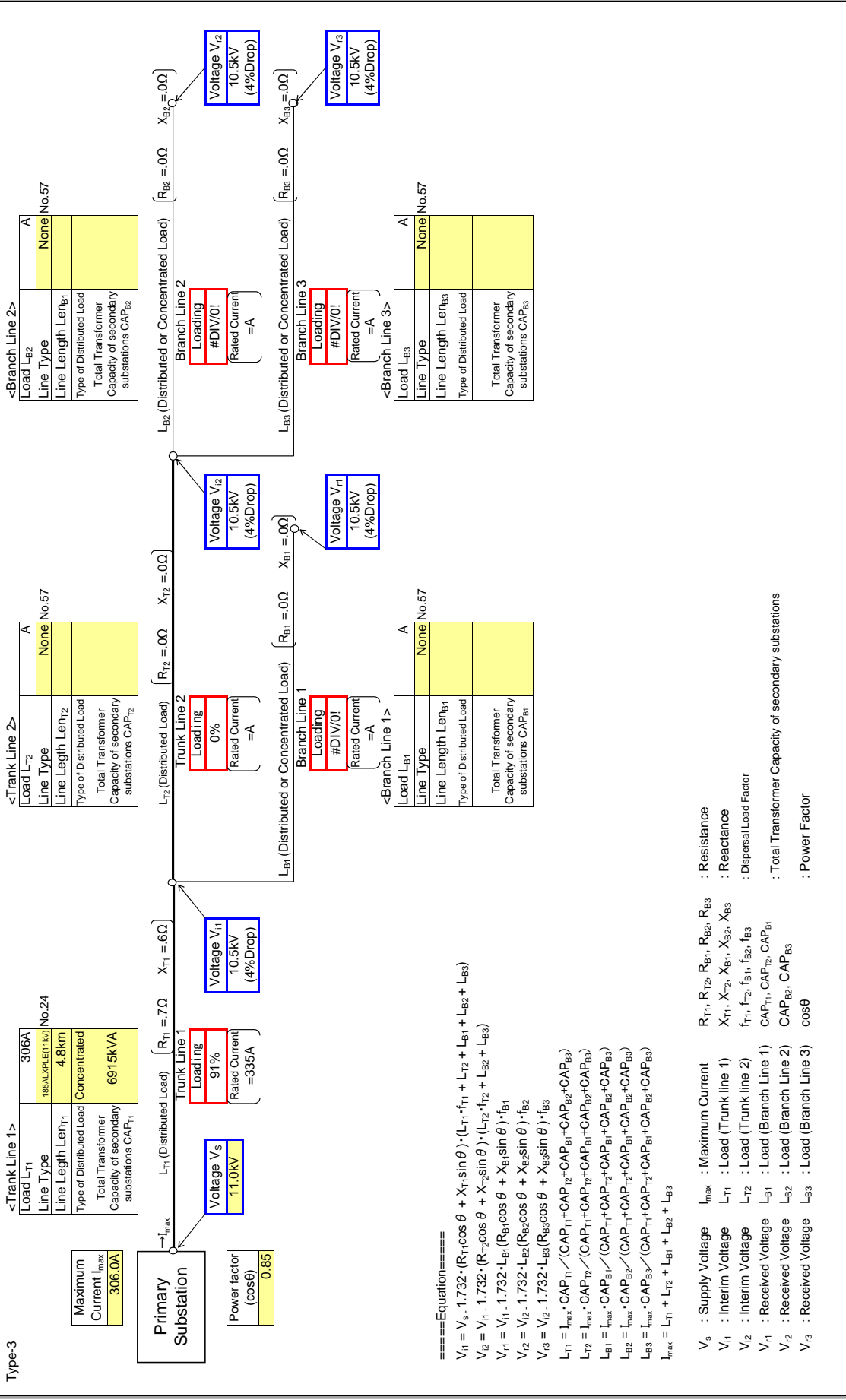
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

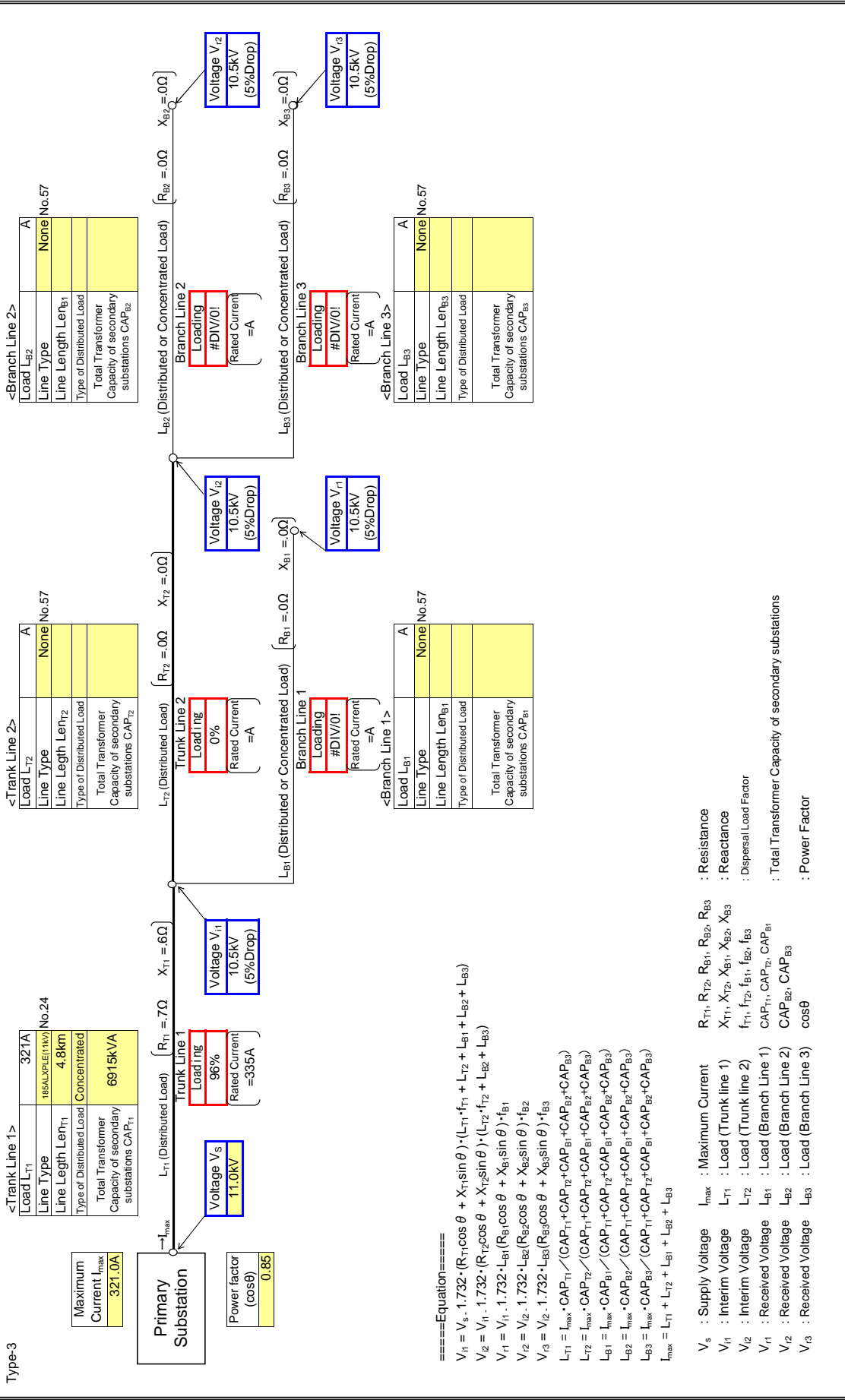
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

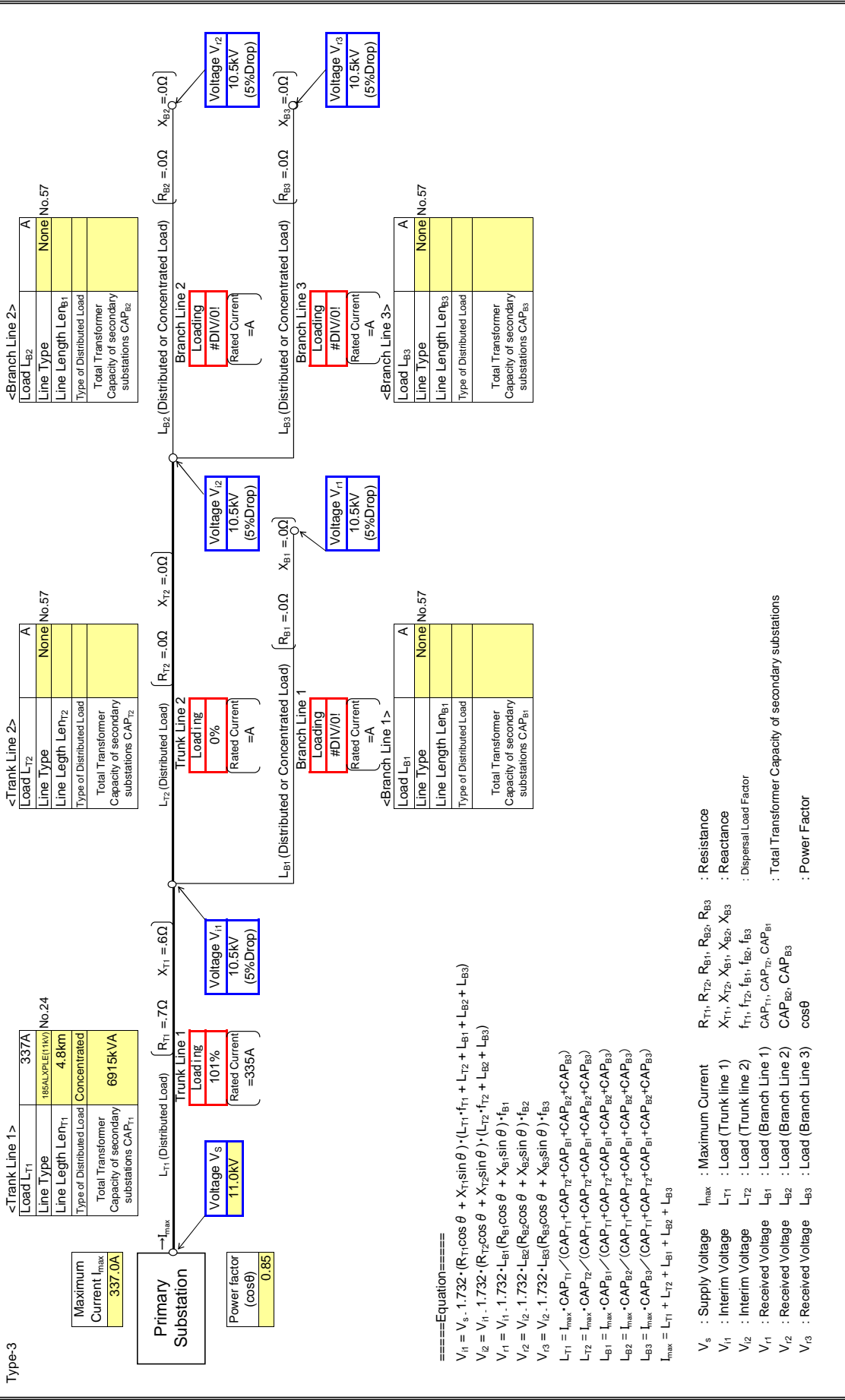
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

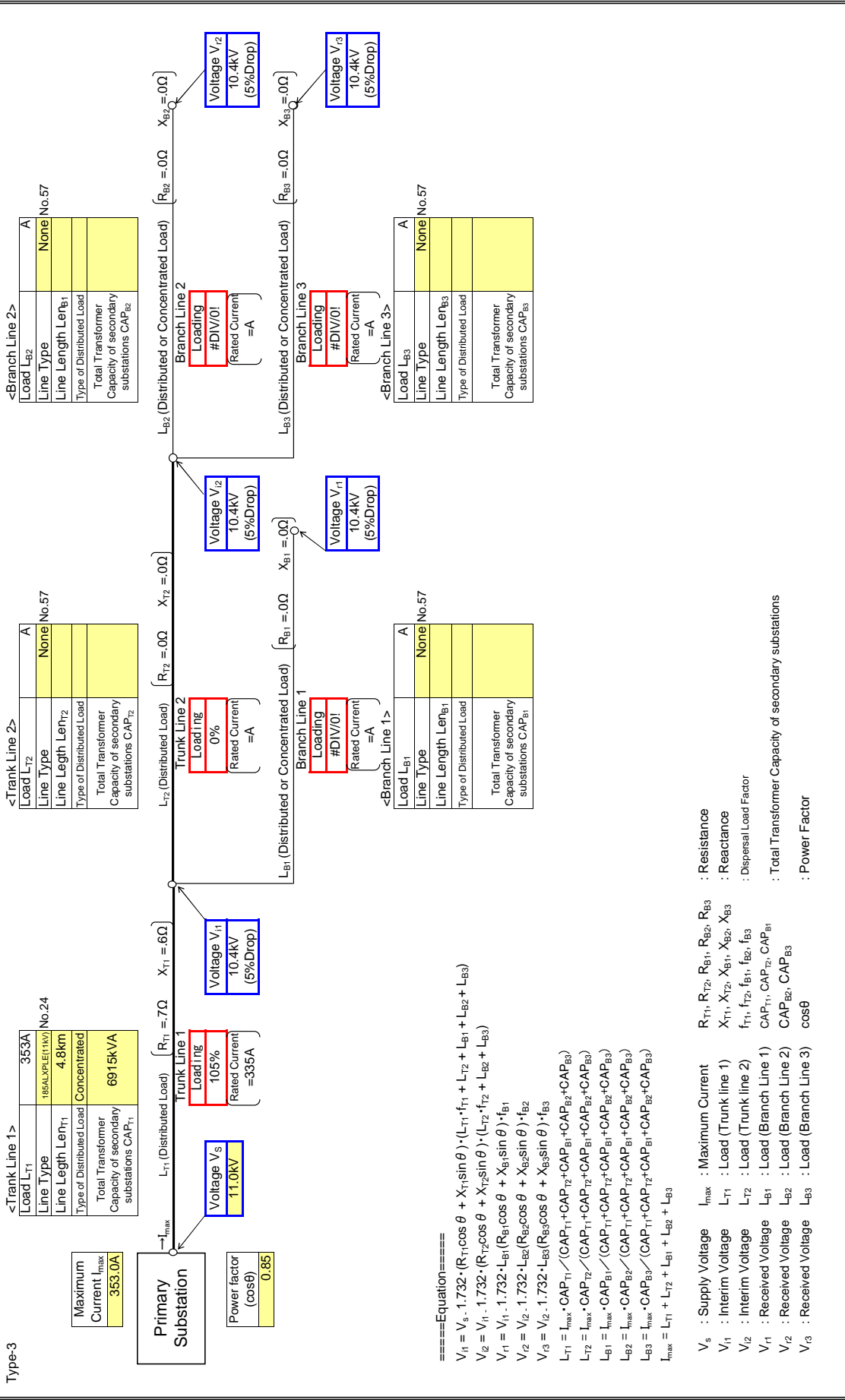
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

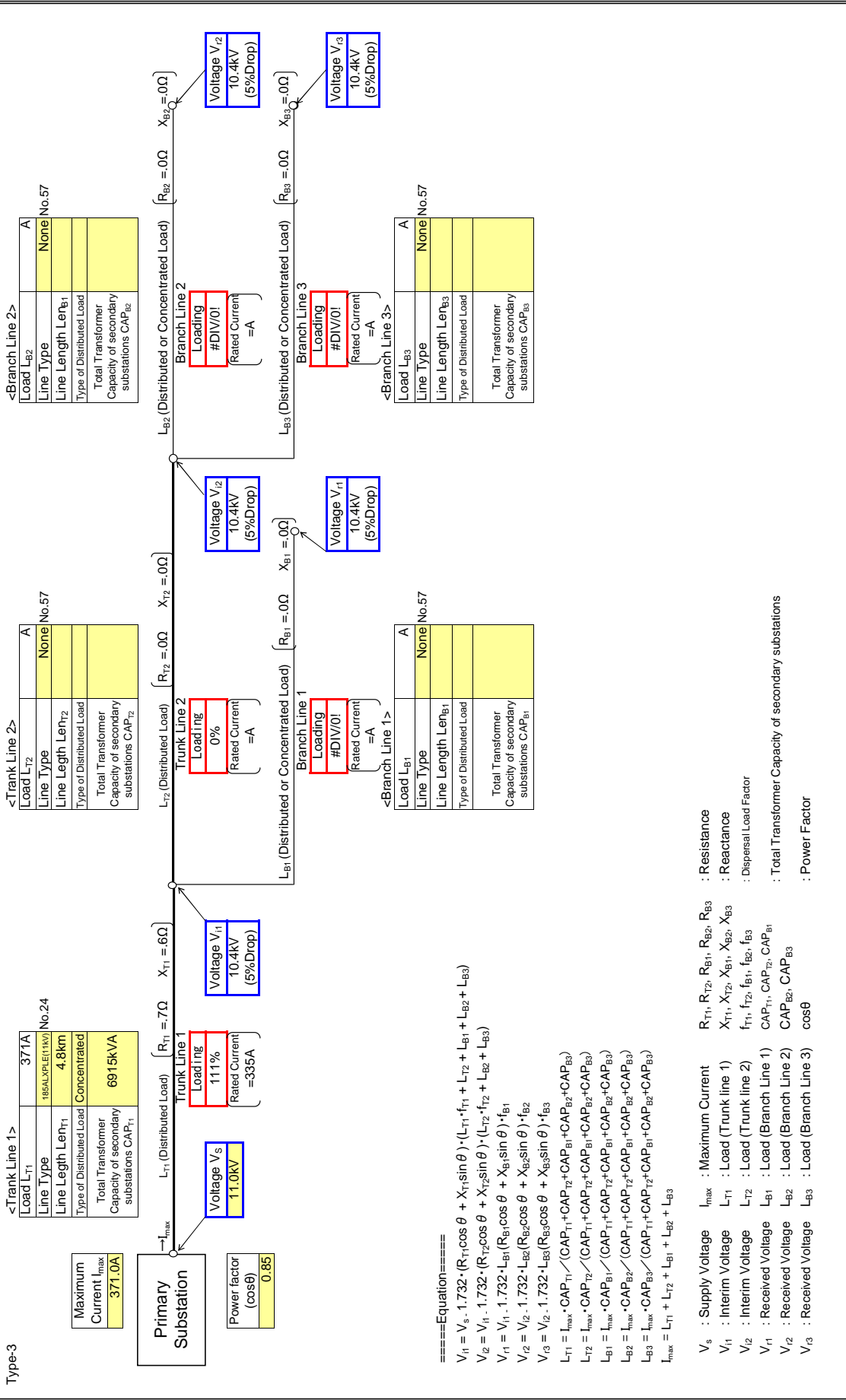
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

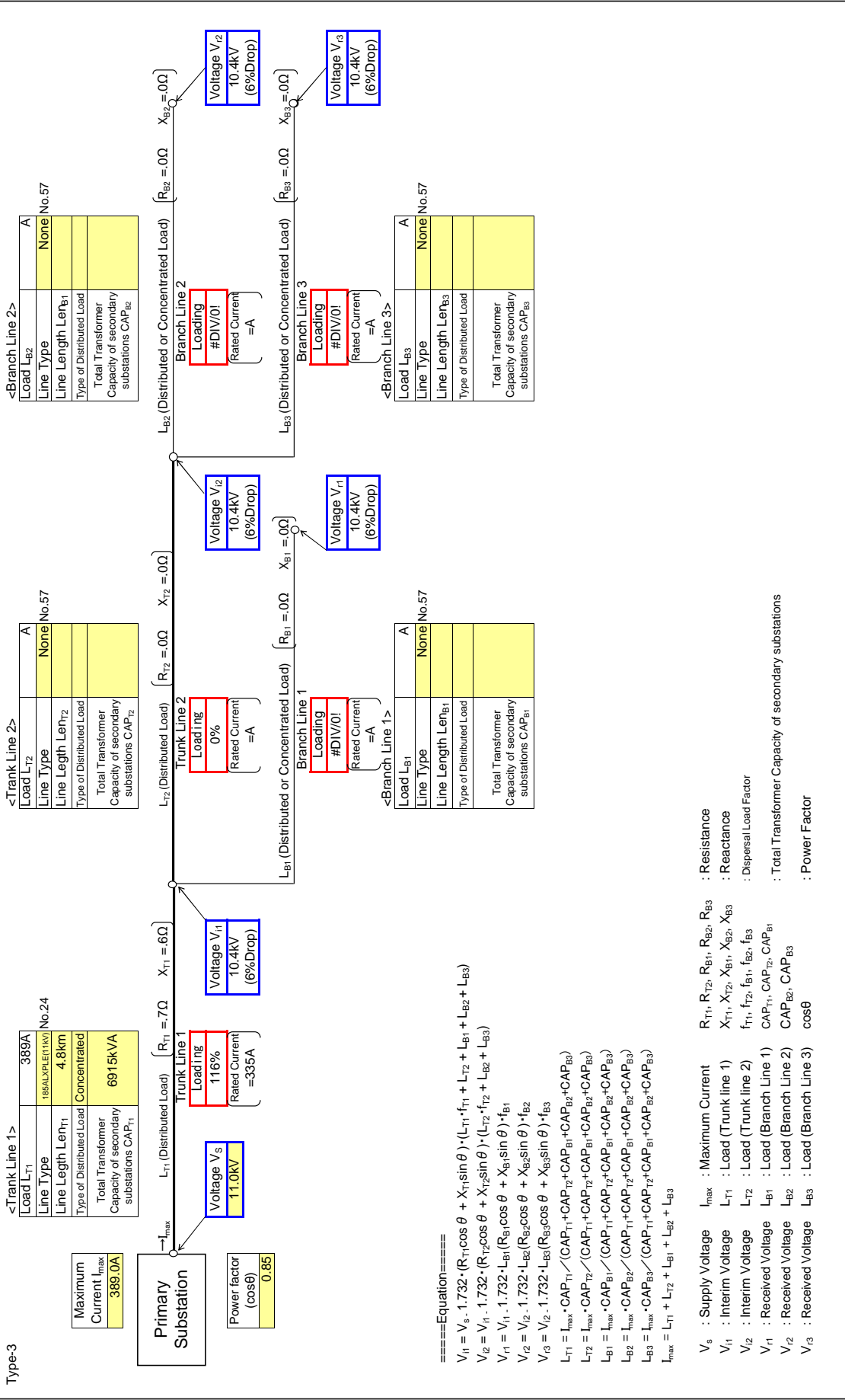
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

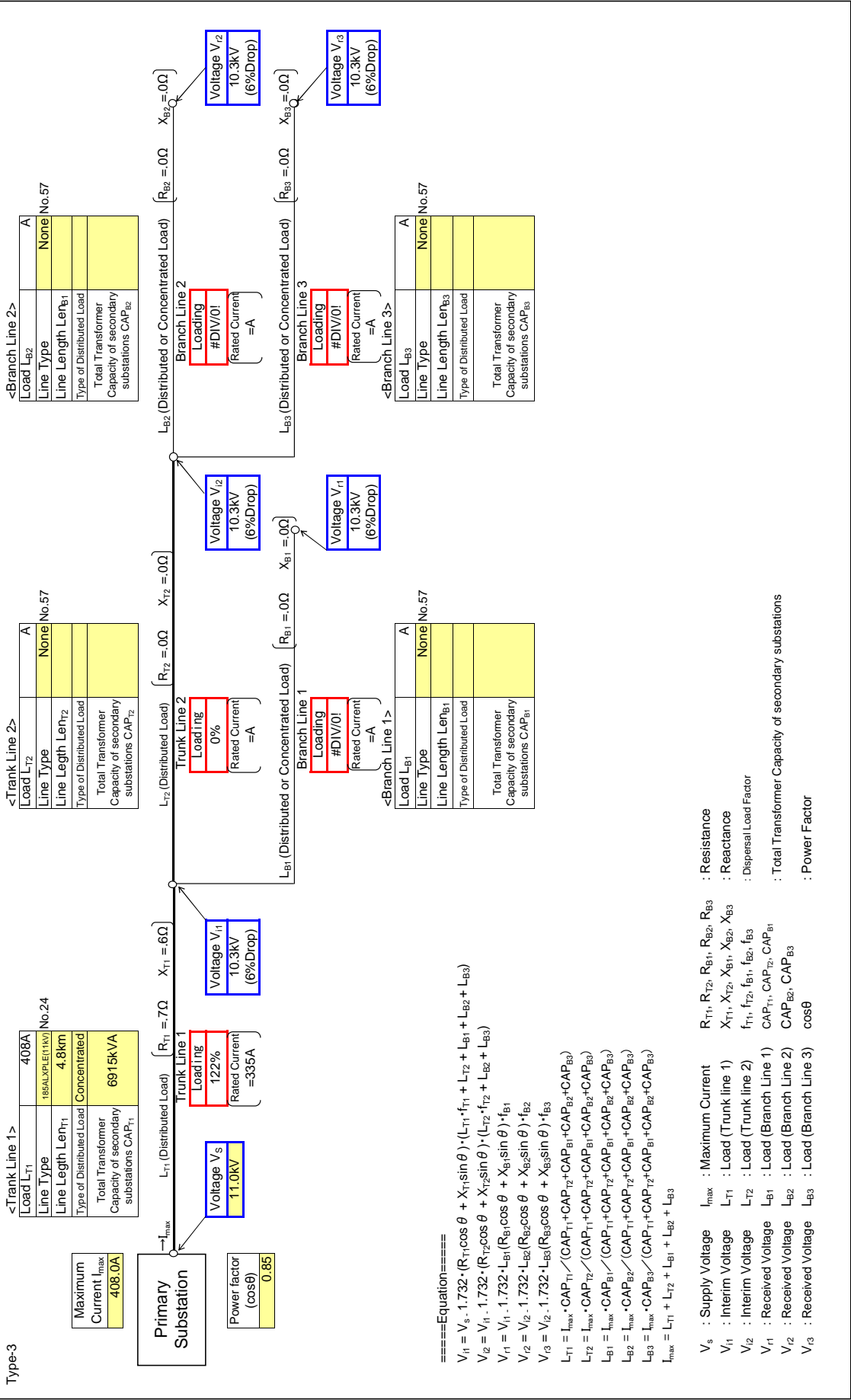
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION D
Feeder Name	D24

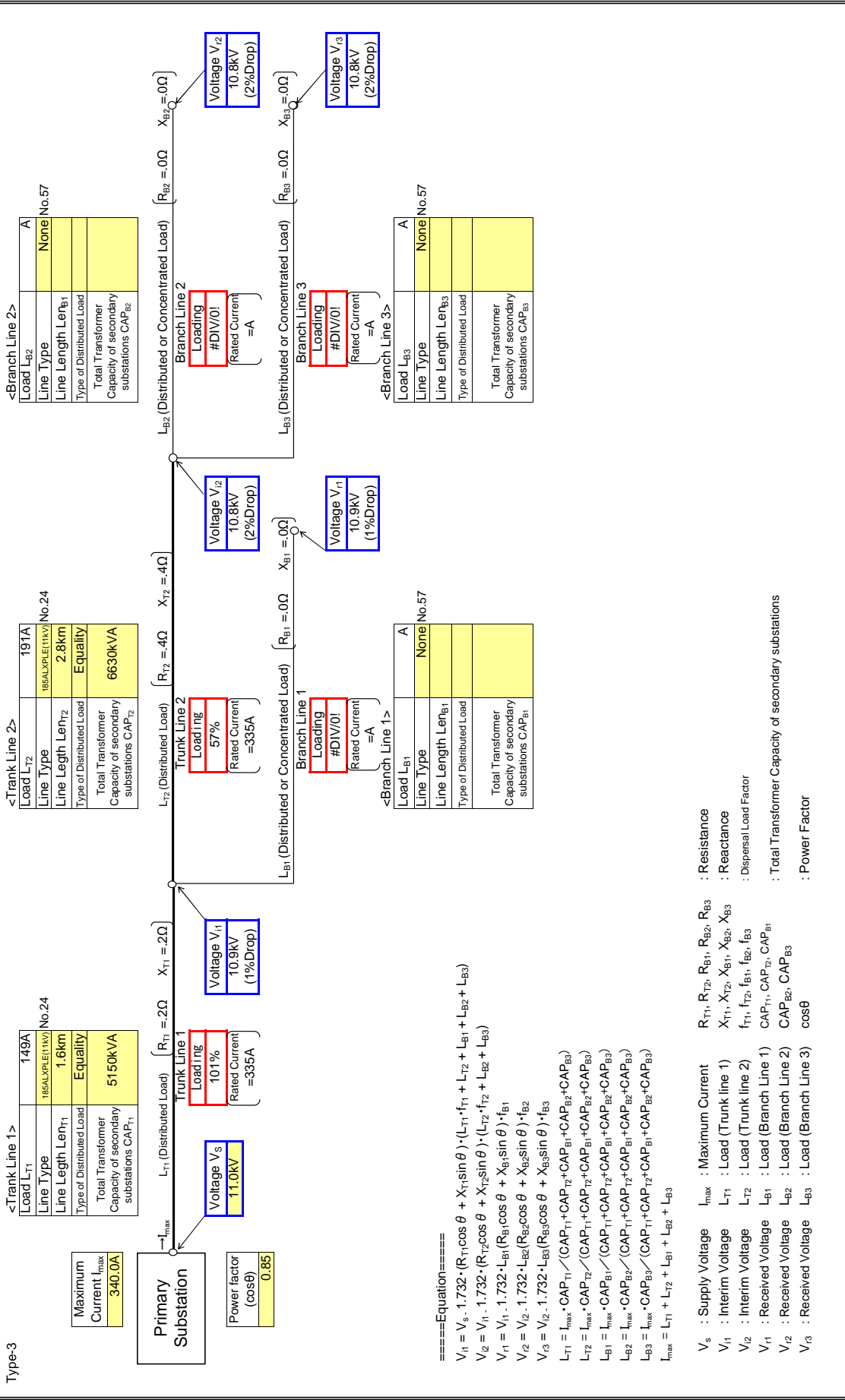
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E07

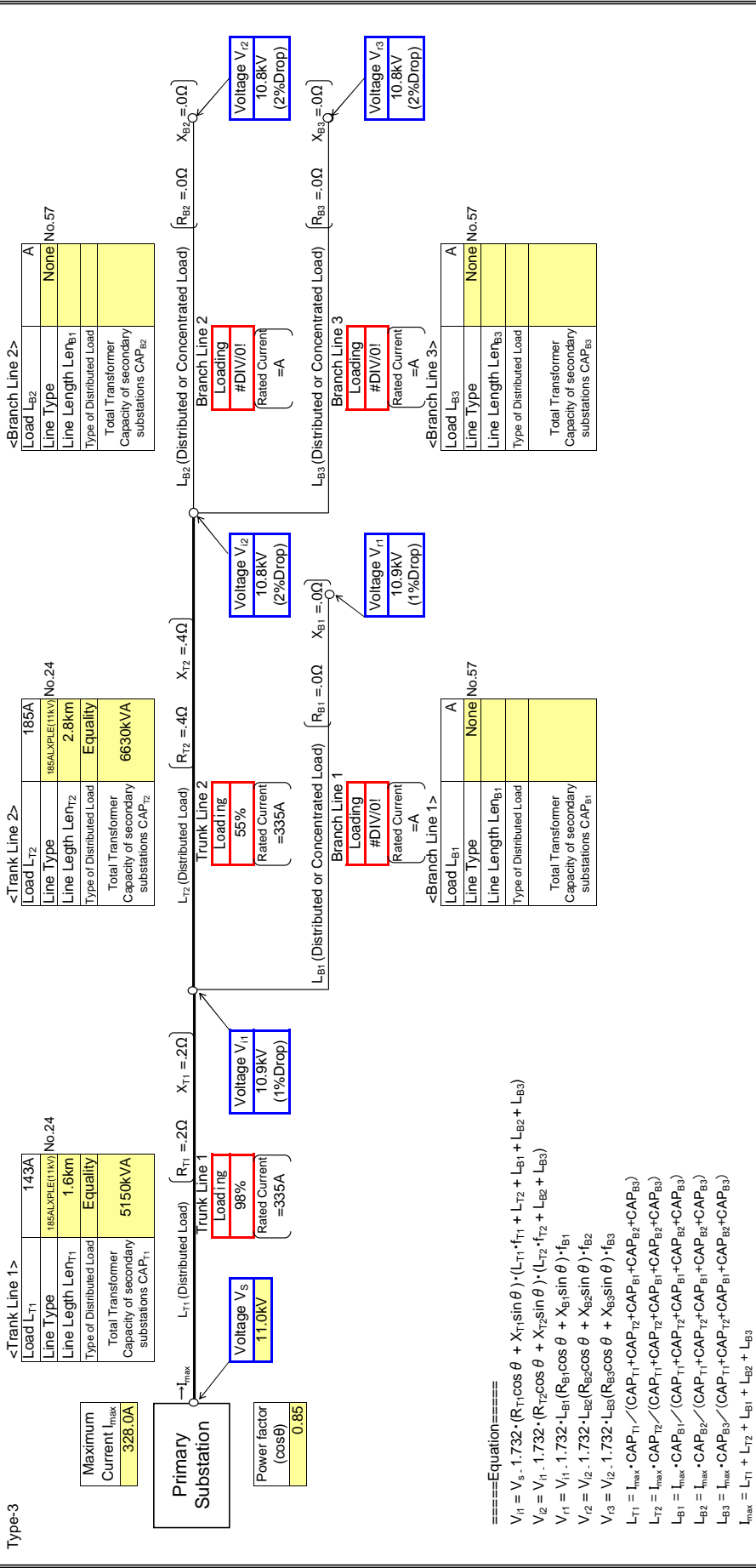
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

Input data in colored cells

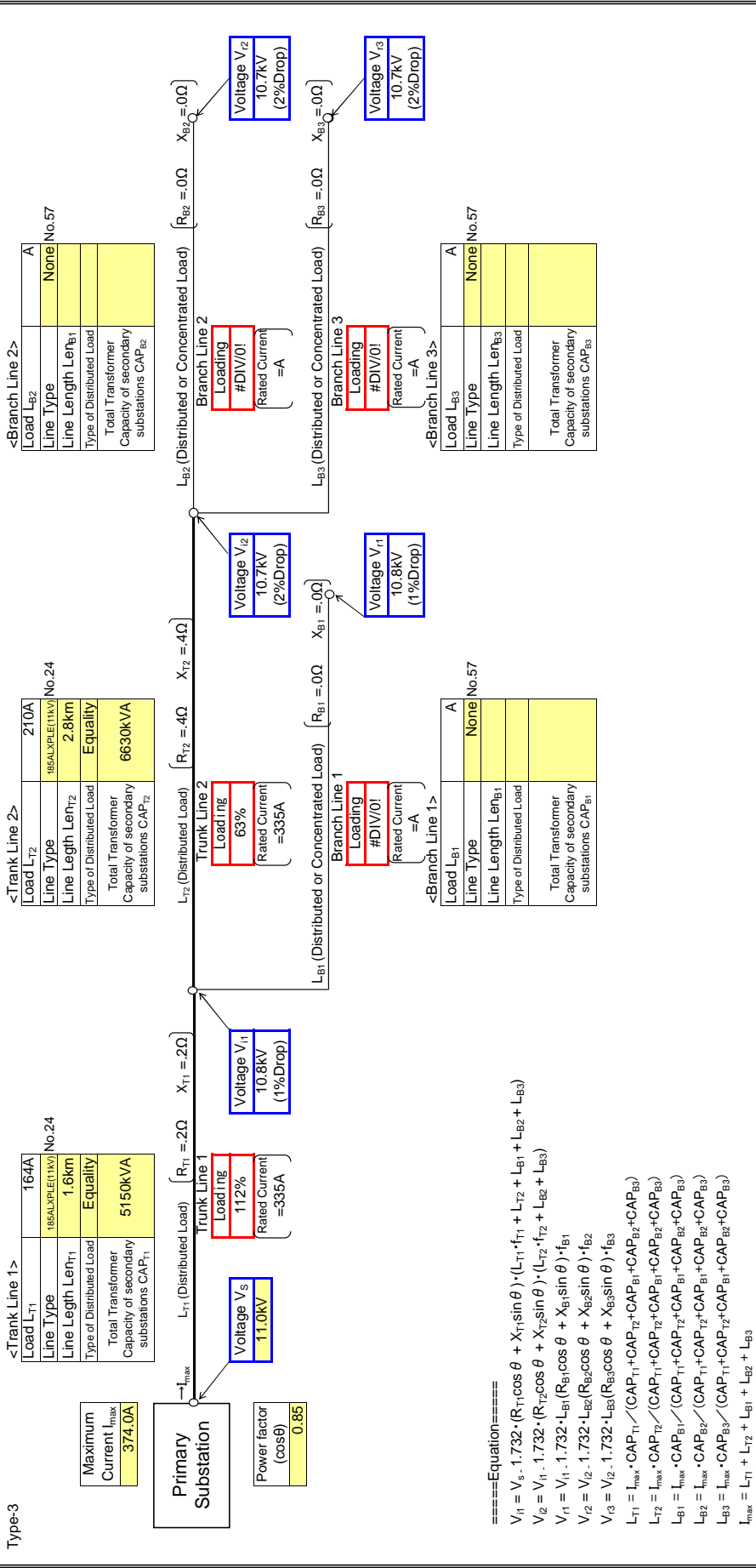


- ====Equation====
- $V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
- $V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
- $V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
- $V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
- $V_{r3} = V_{i3} \cdot 1.732 \cdot L_{B3} \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$
- $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- V_{i1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- V_{i2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
- V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos\theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

Input data in colored cells

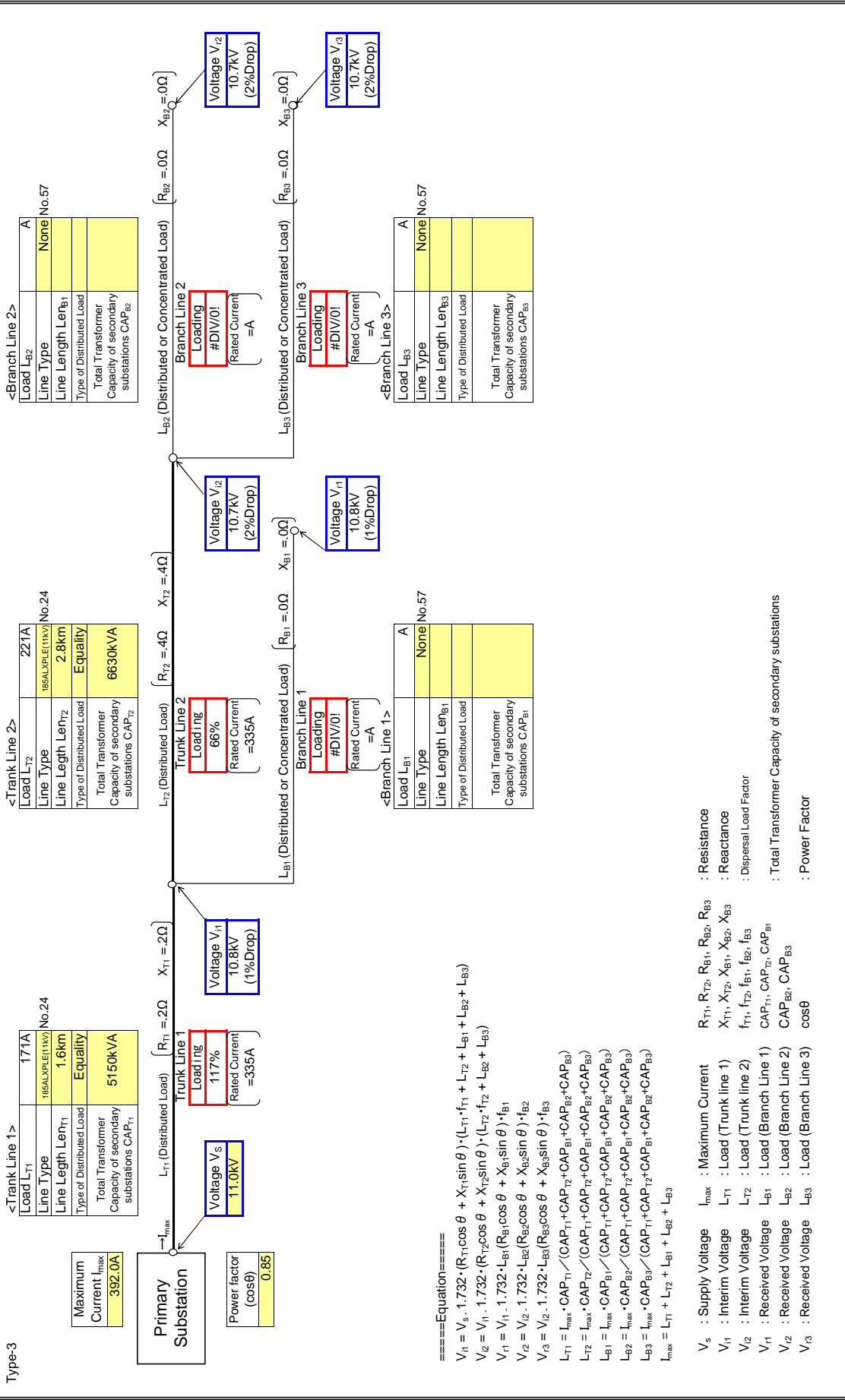


- ====Equation====
- $V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{r2} = V_{r2} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$
- $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{r1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{r2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

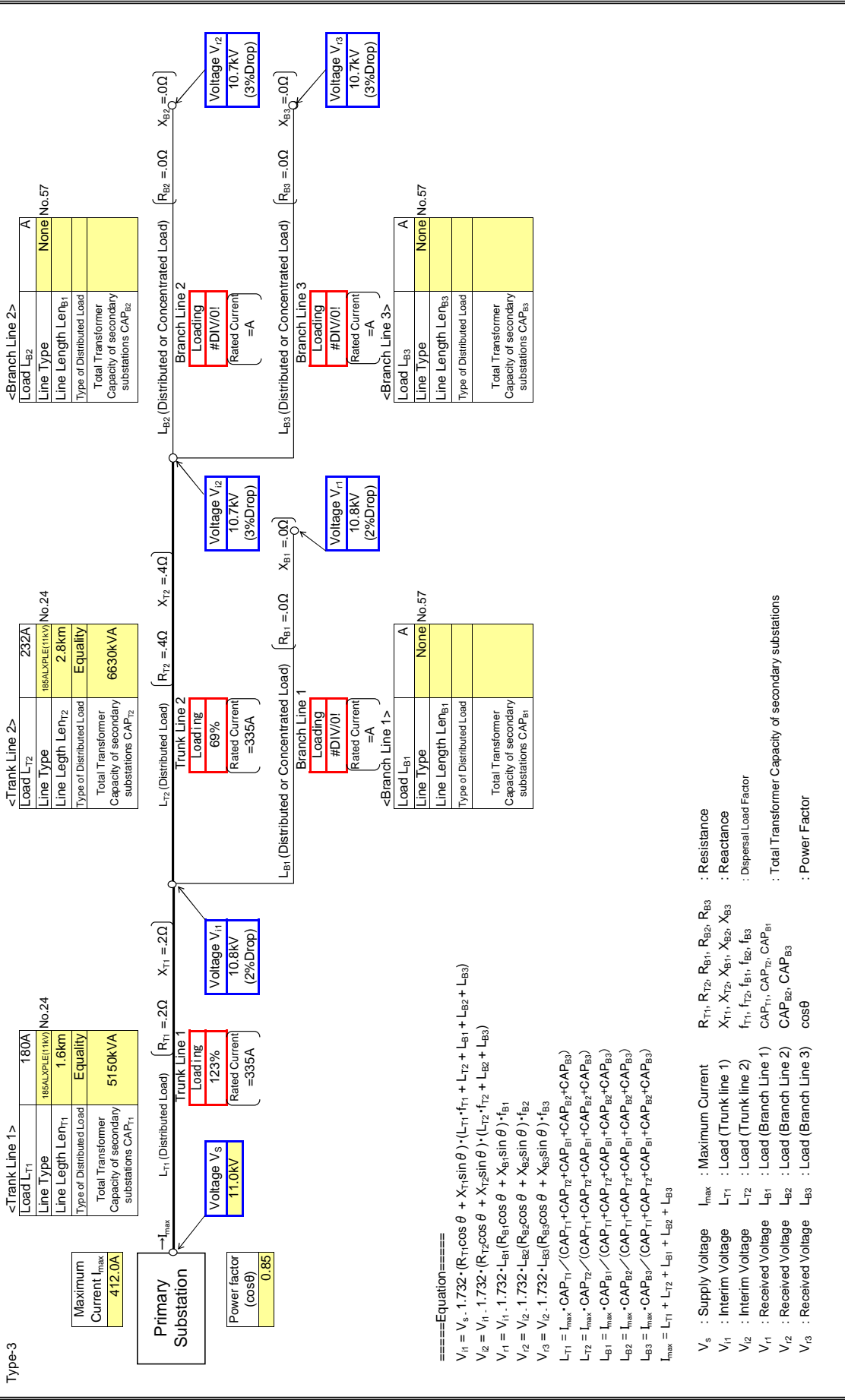
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

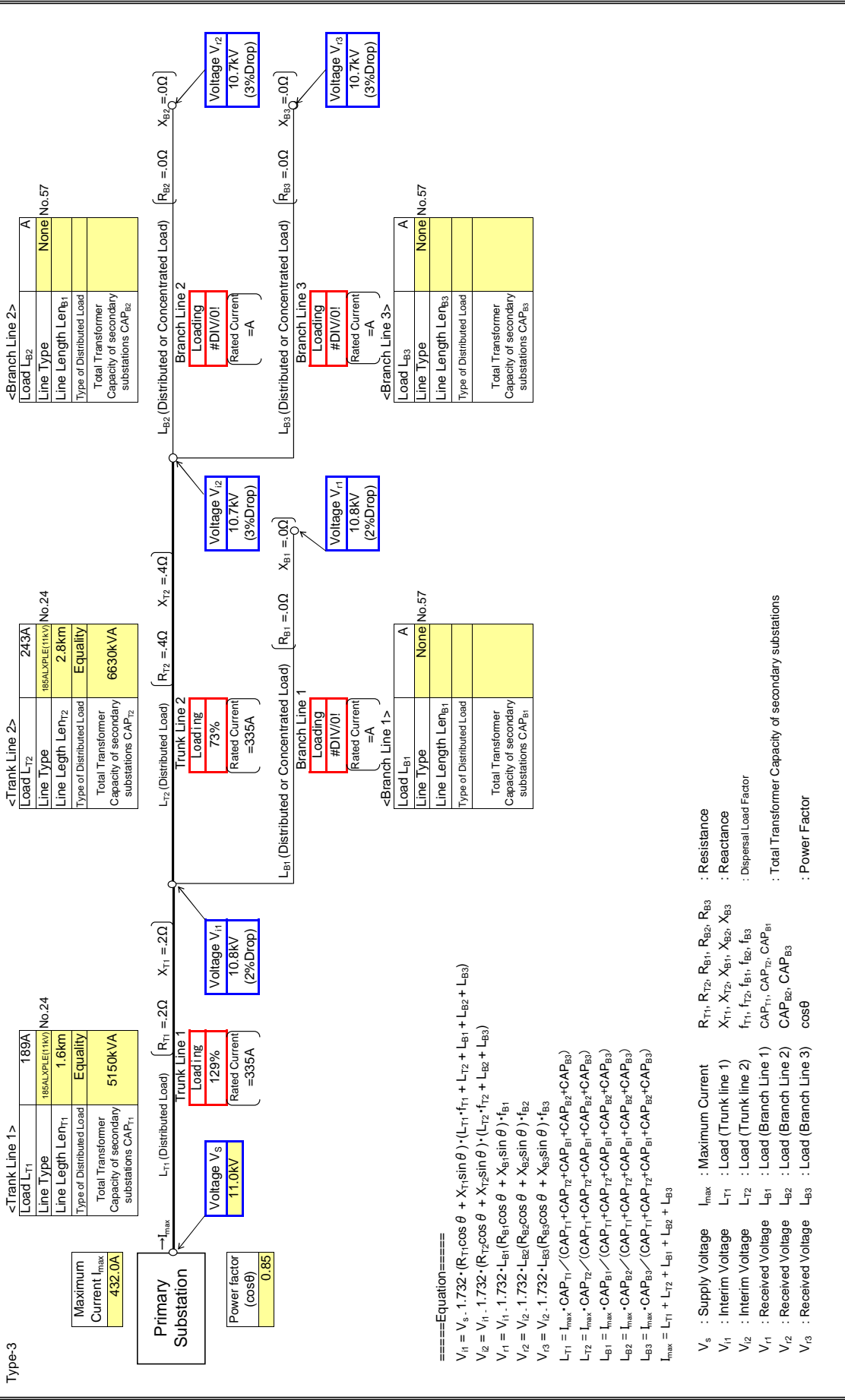
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

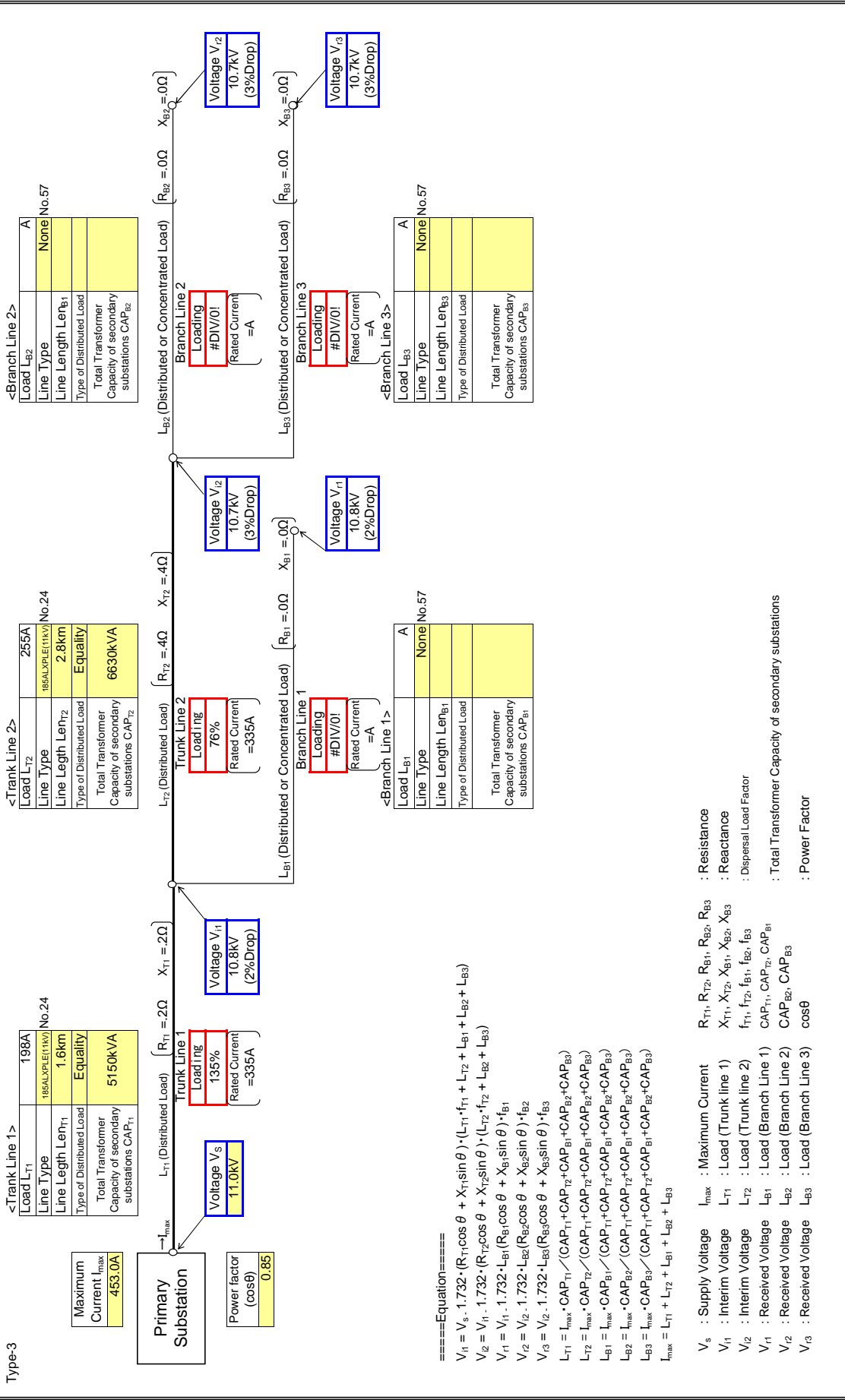
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

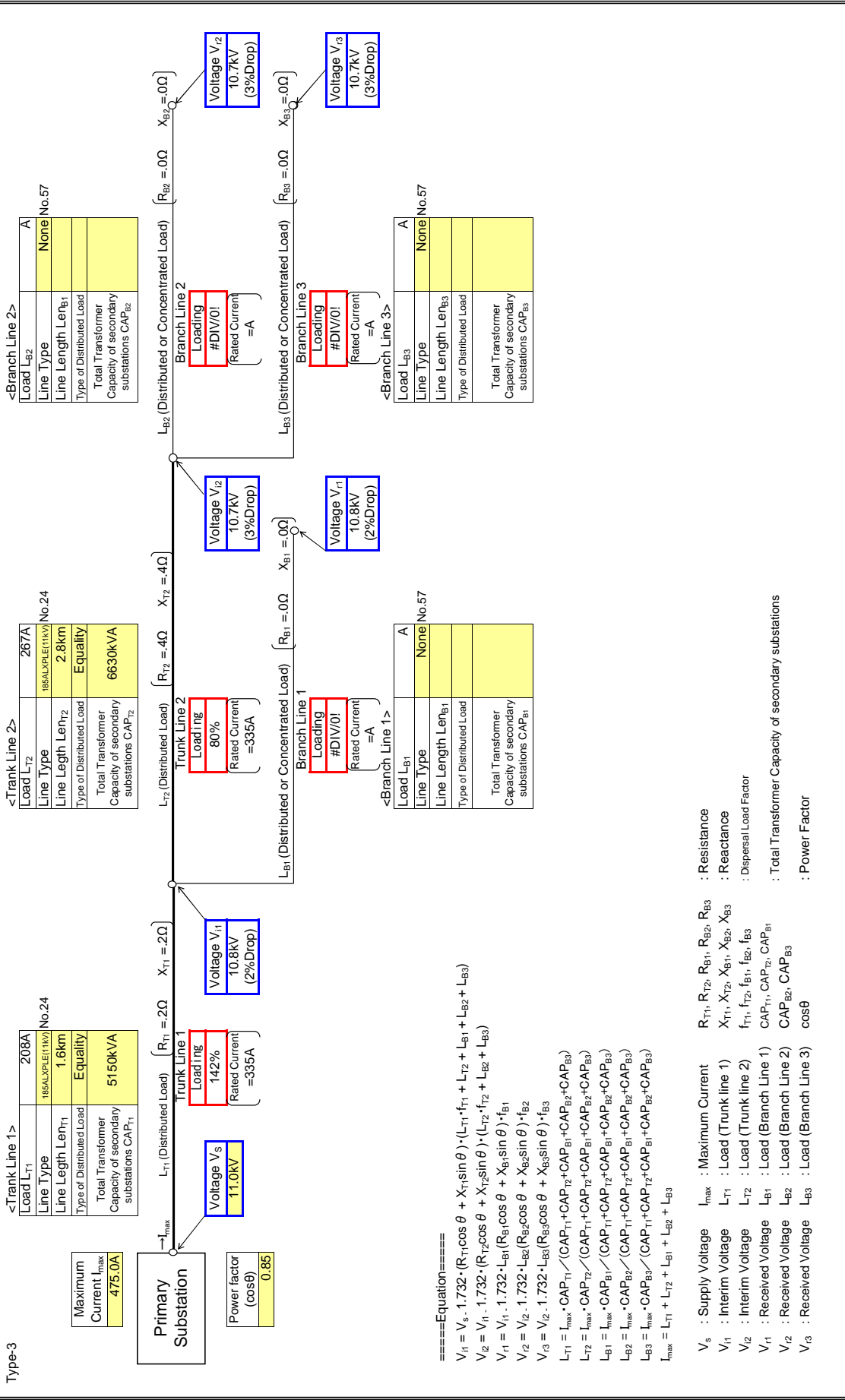
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

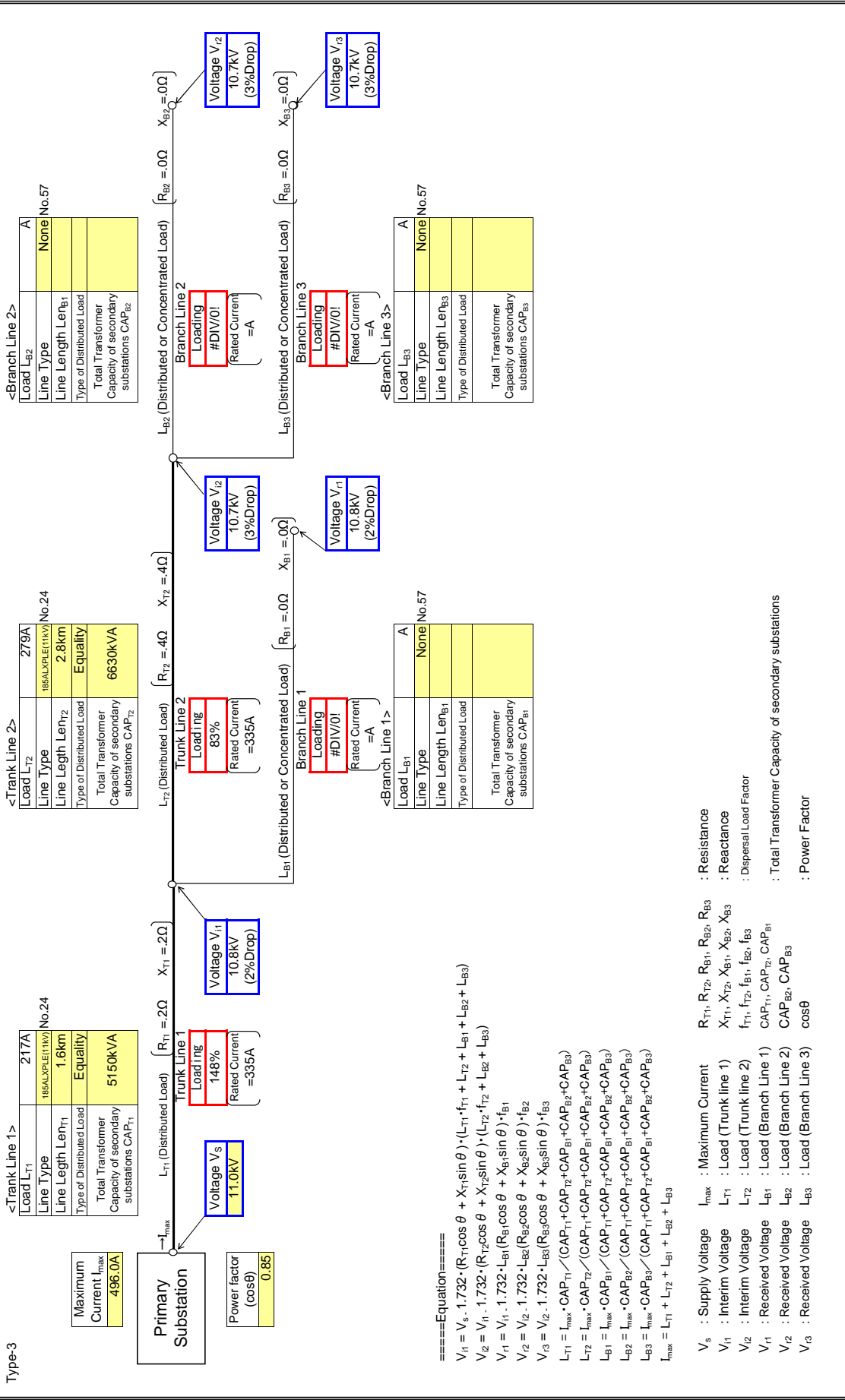
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

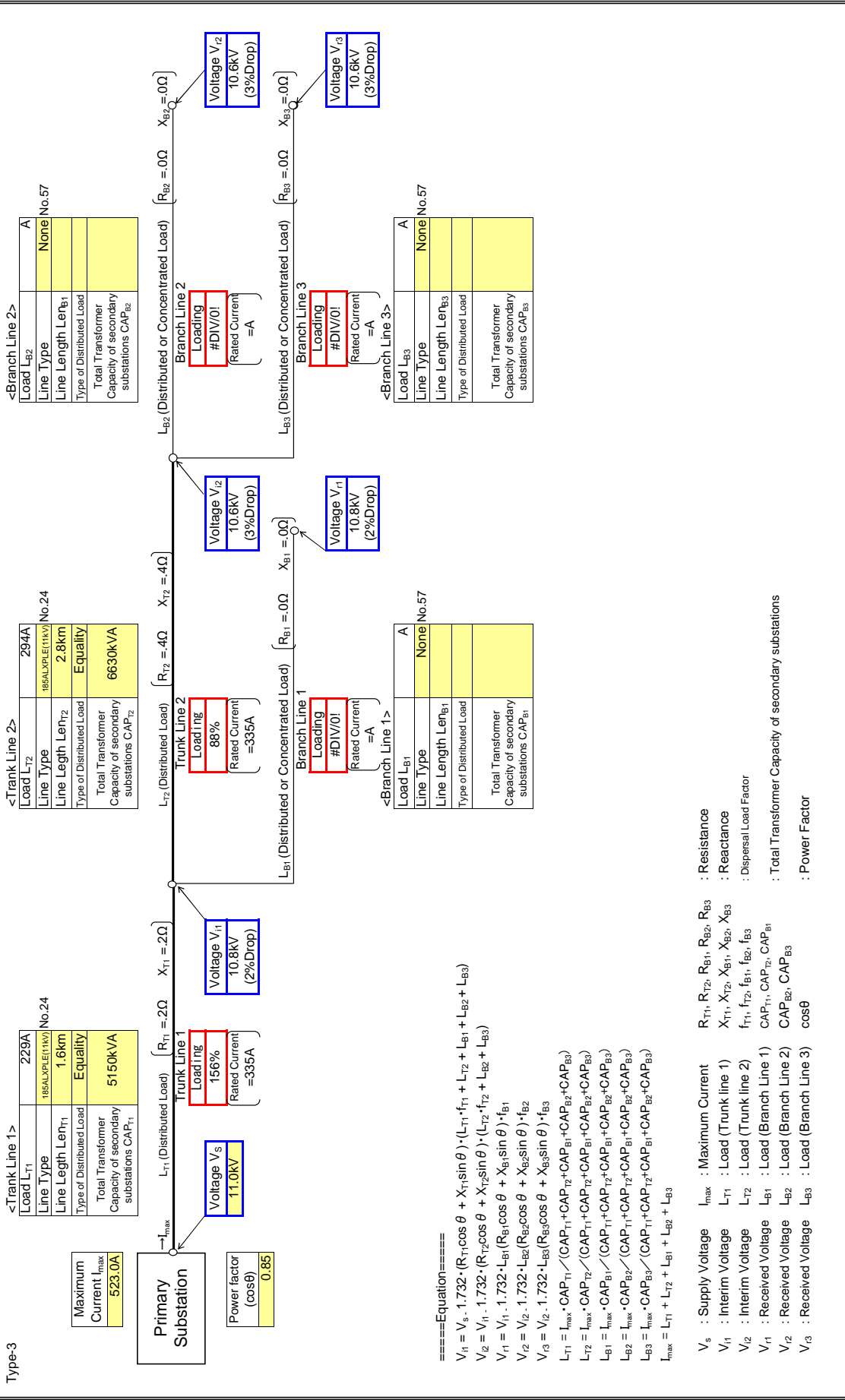
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

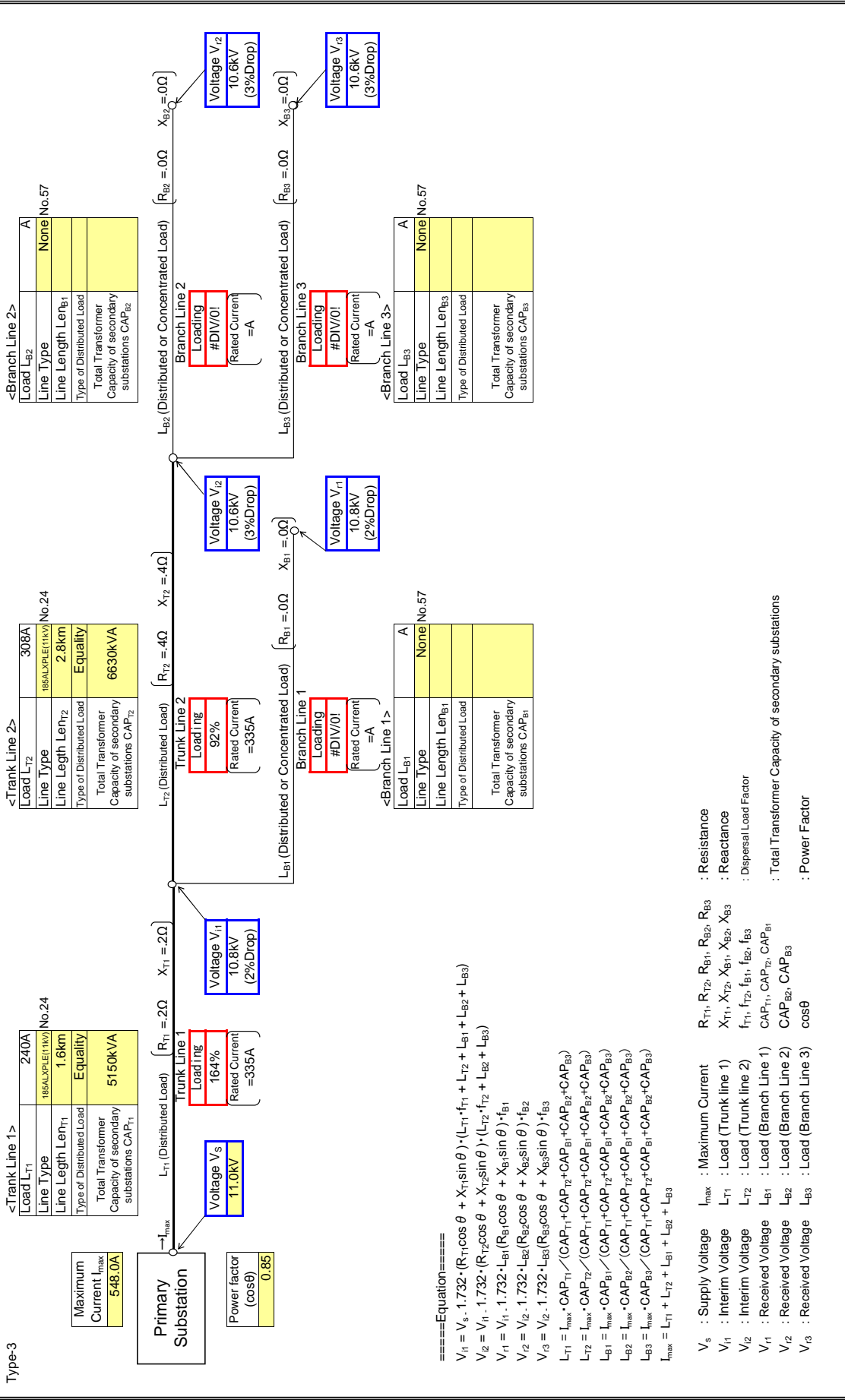
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

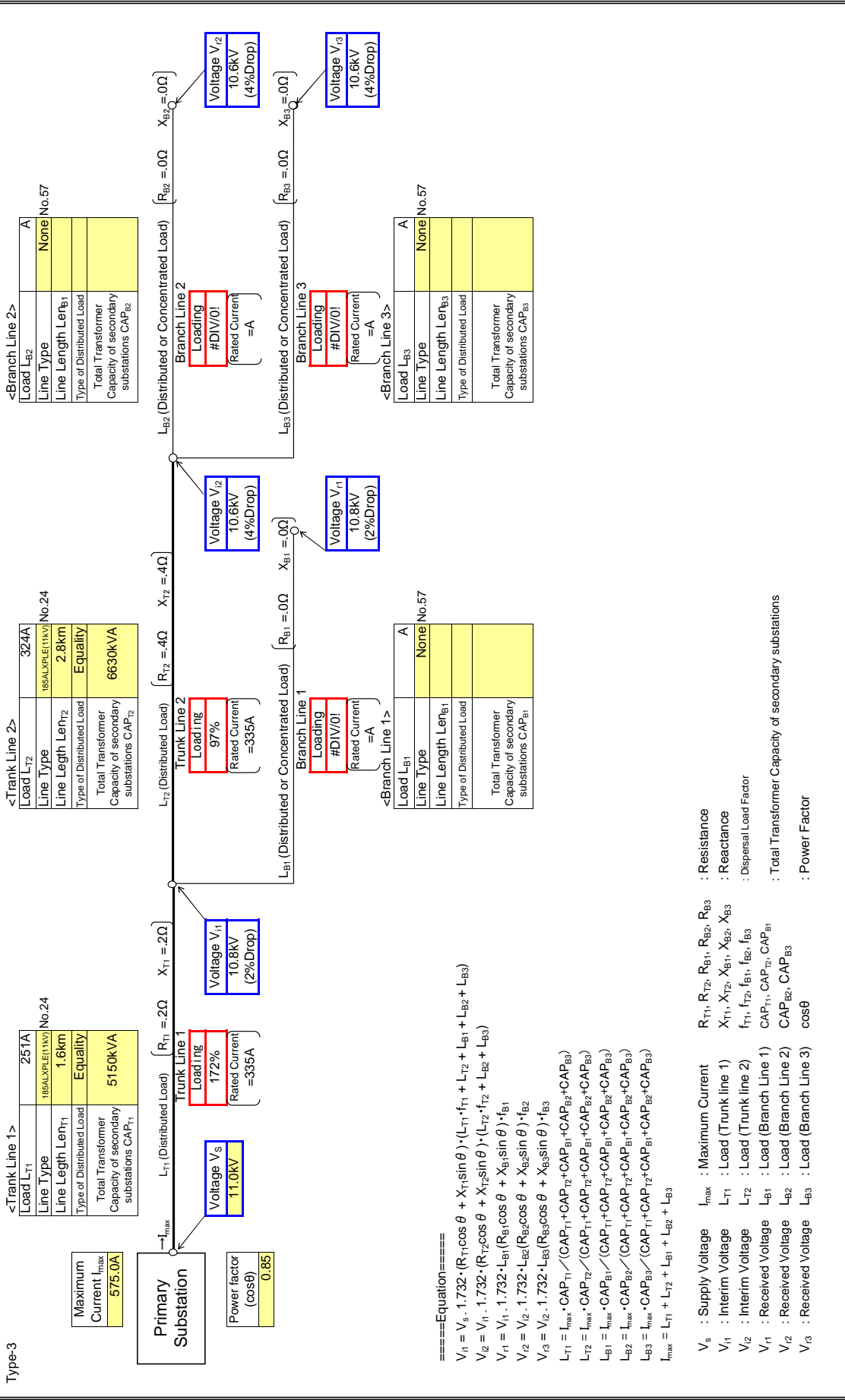
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

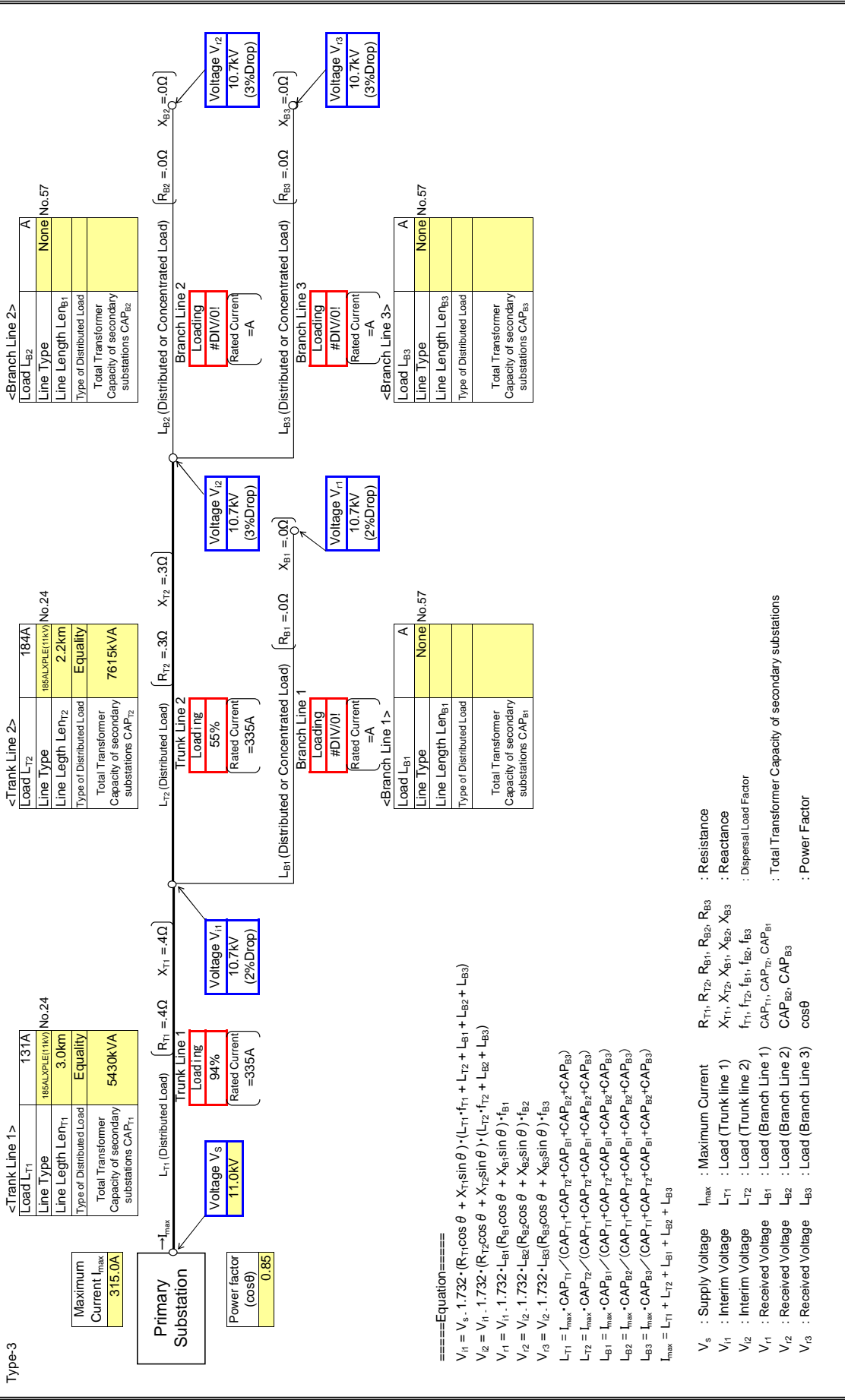
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

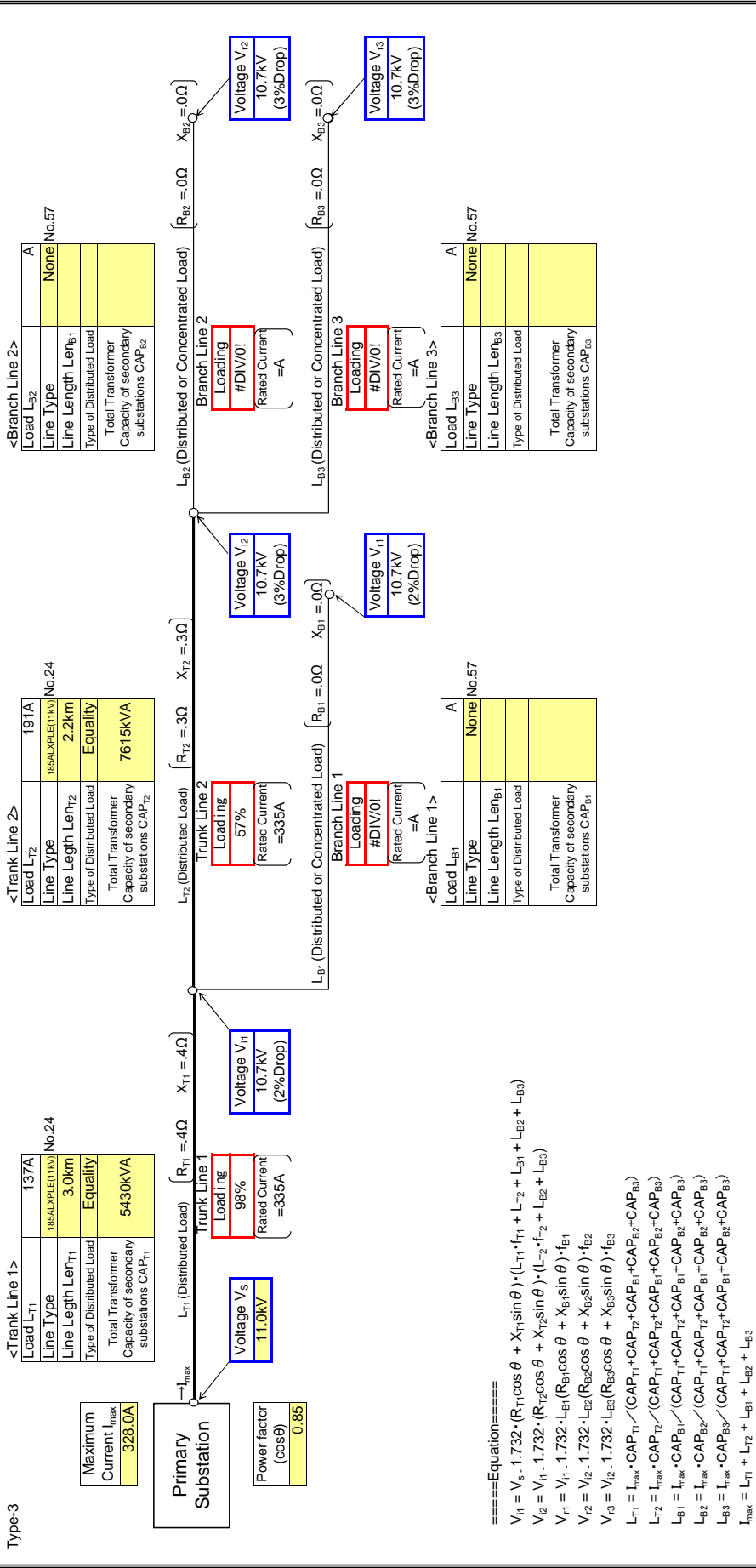
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

Input data in colored cells

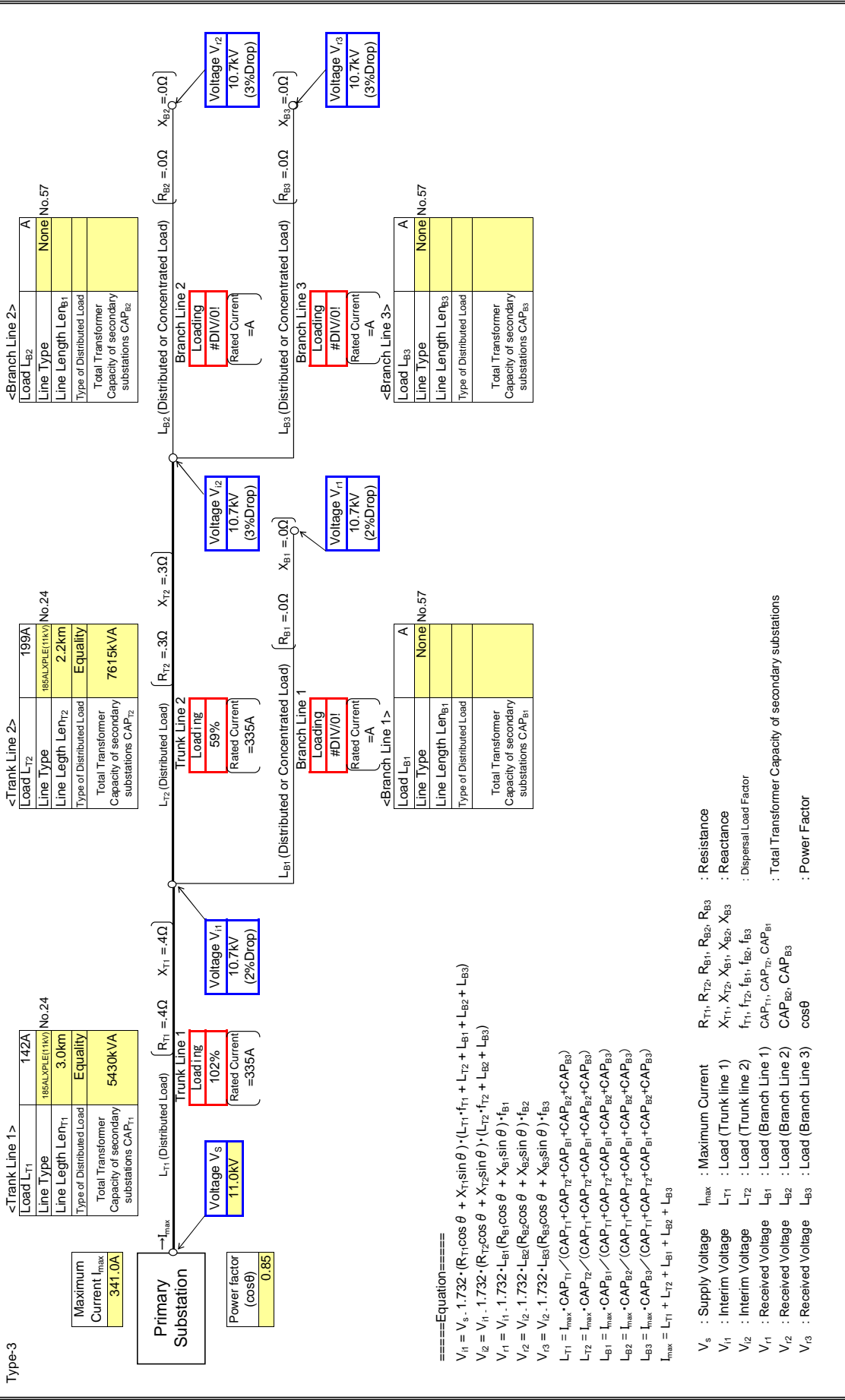


====Equation====
 $V_{11} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{12} = V_{11} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{13} = V_{12} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{22} = V_{12} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{33} = V_{22} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$
 $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

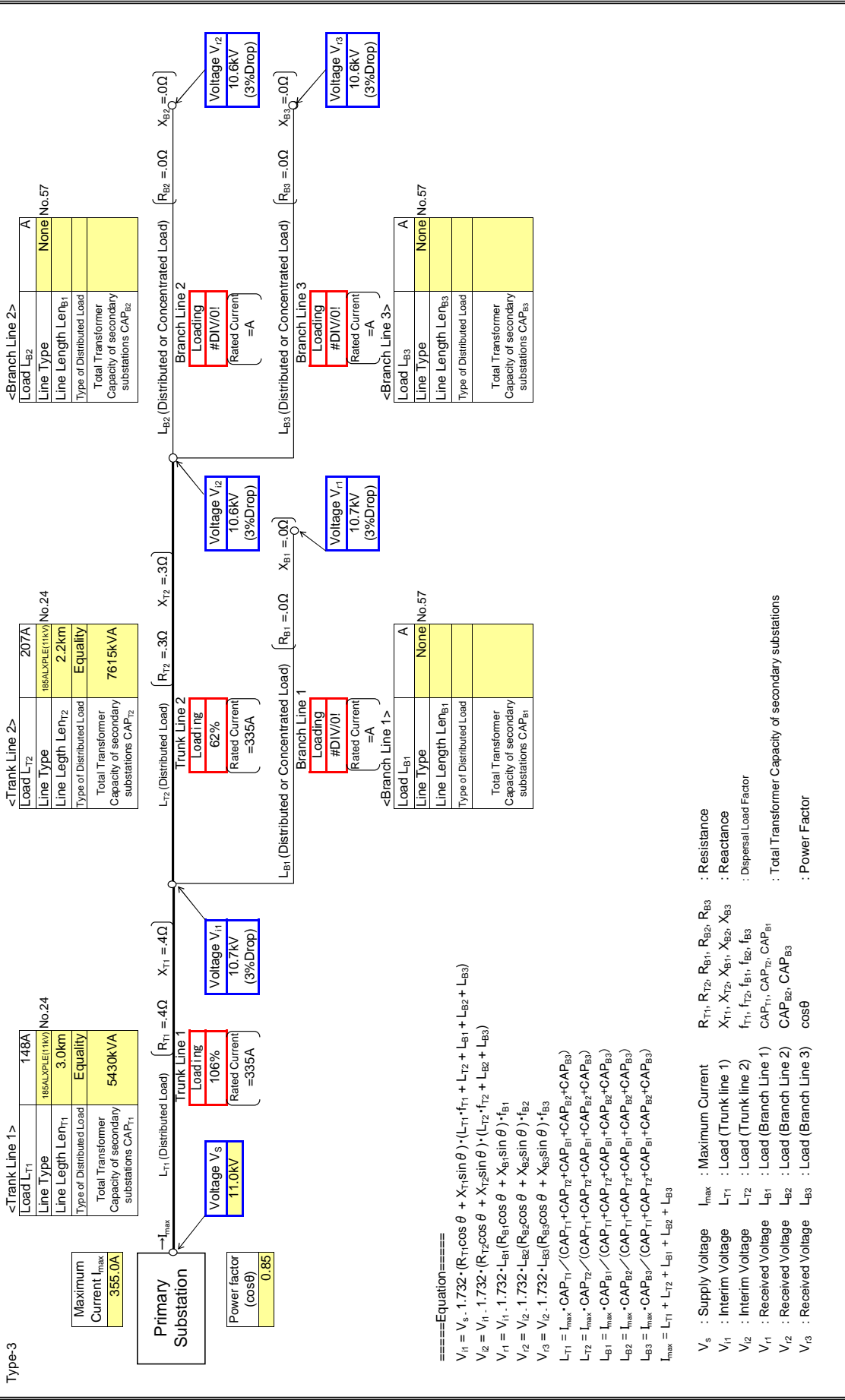
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

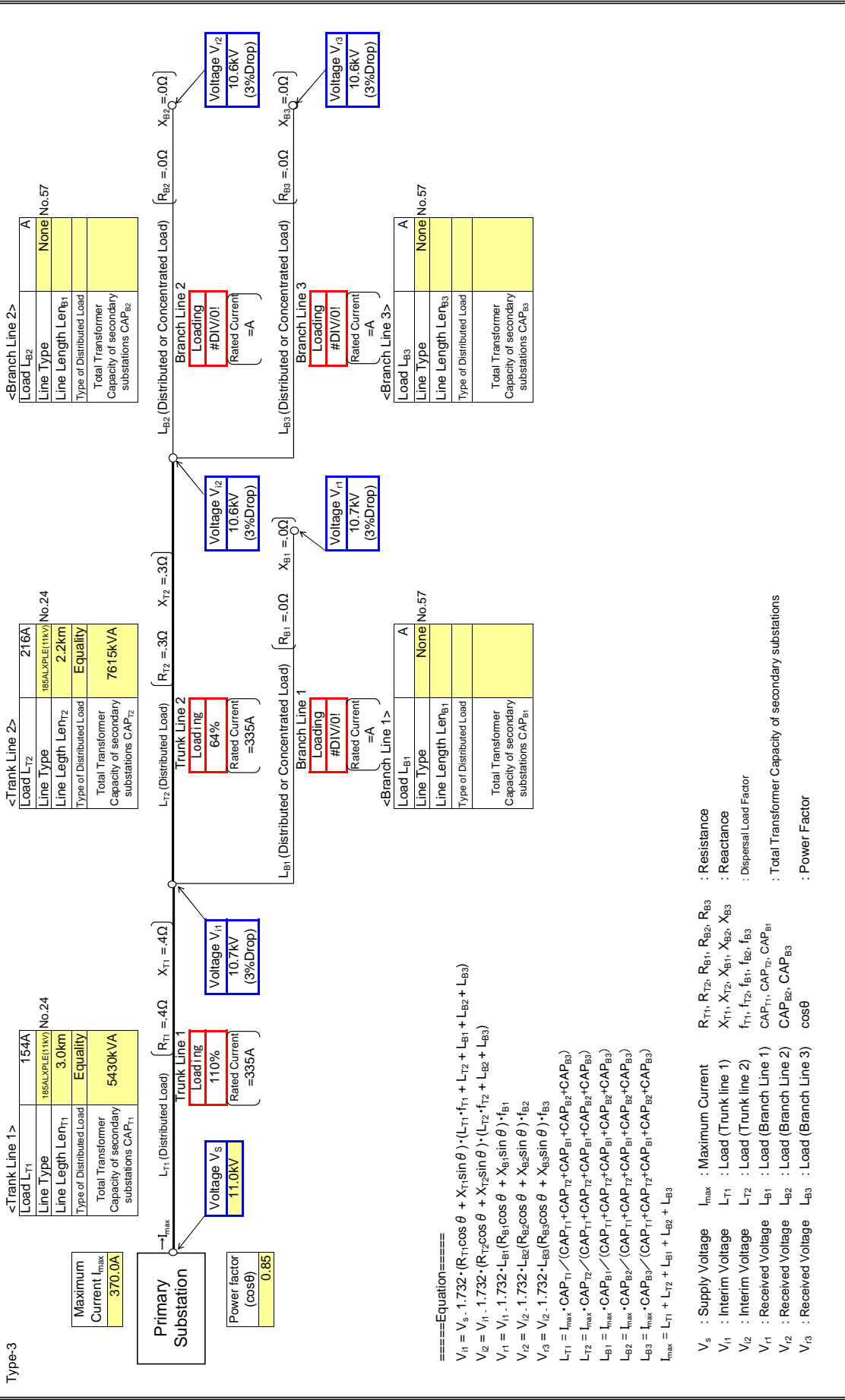
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

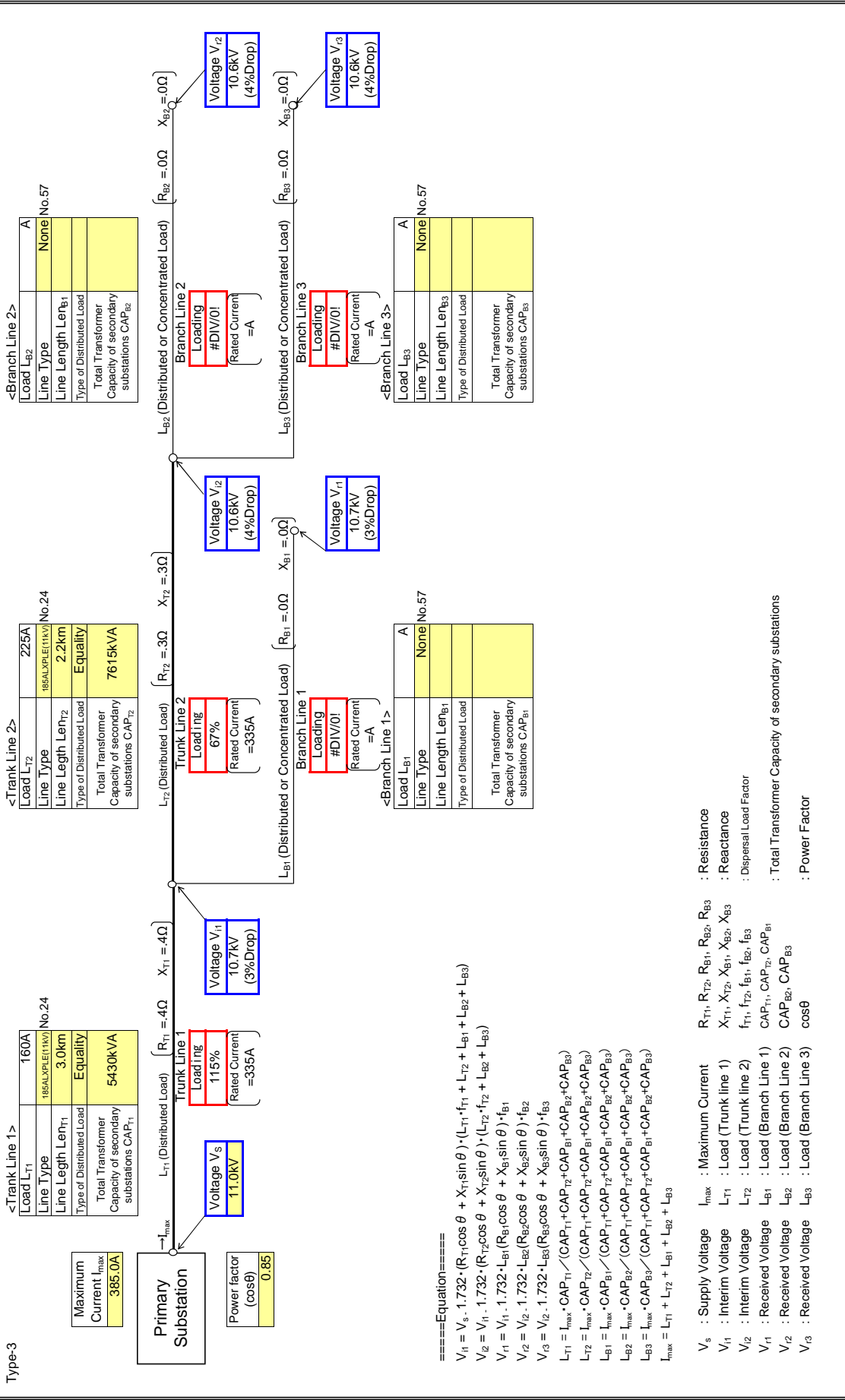
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

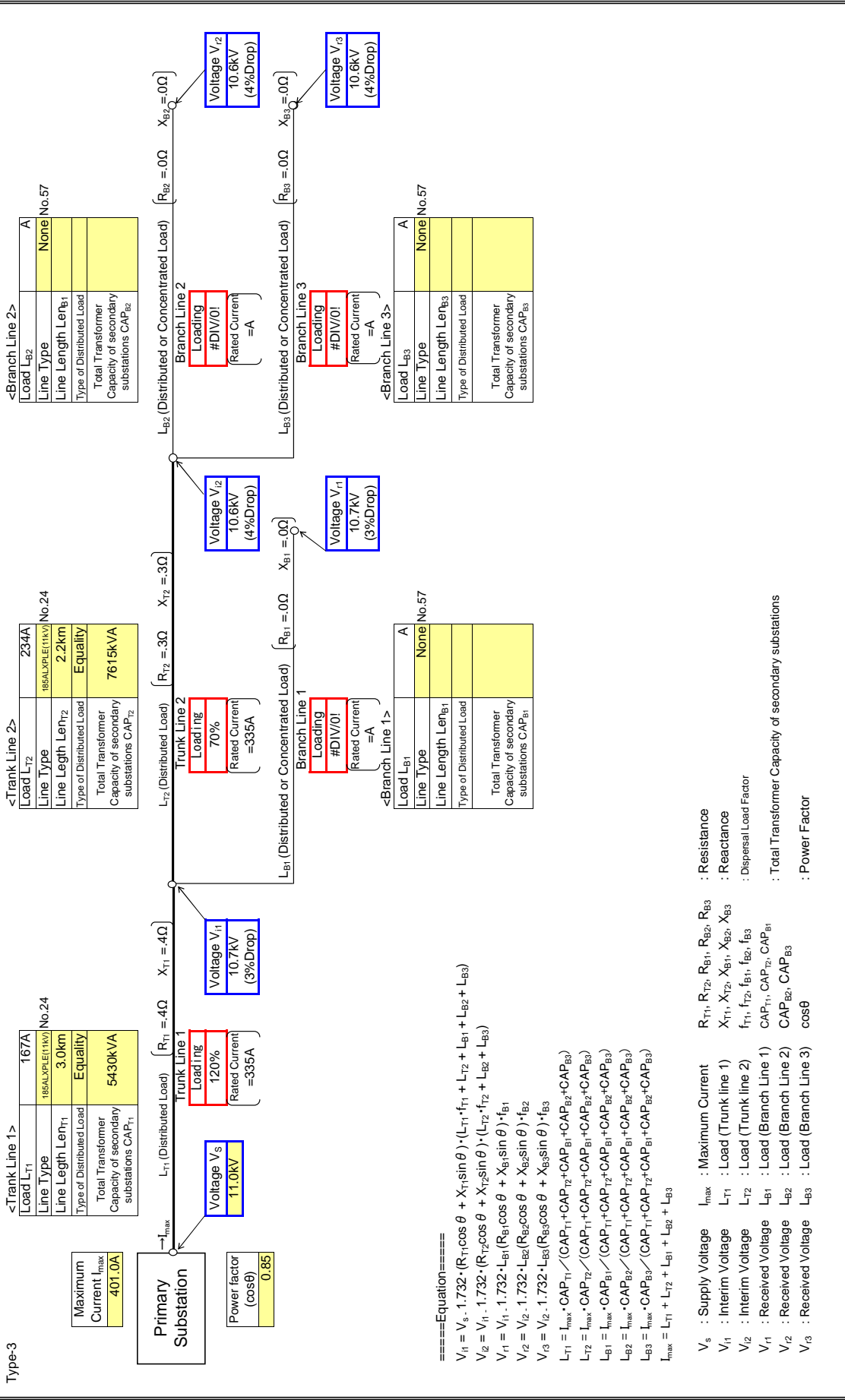
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

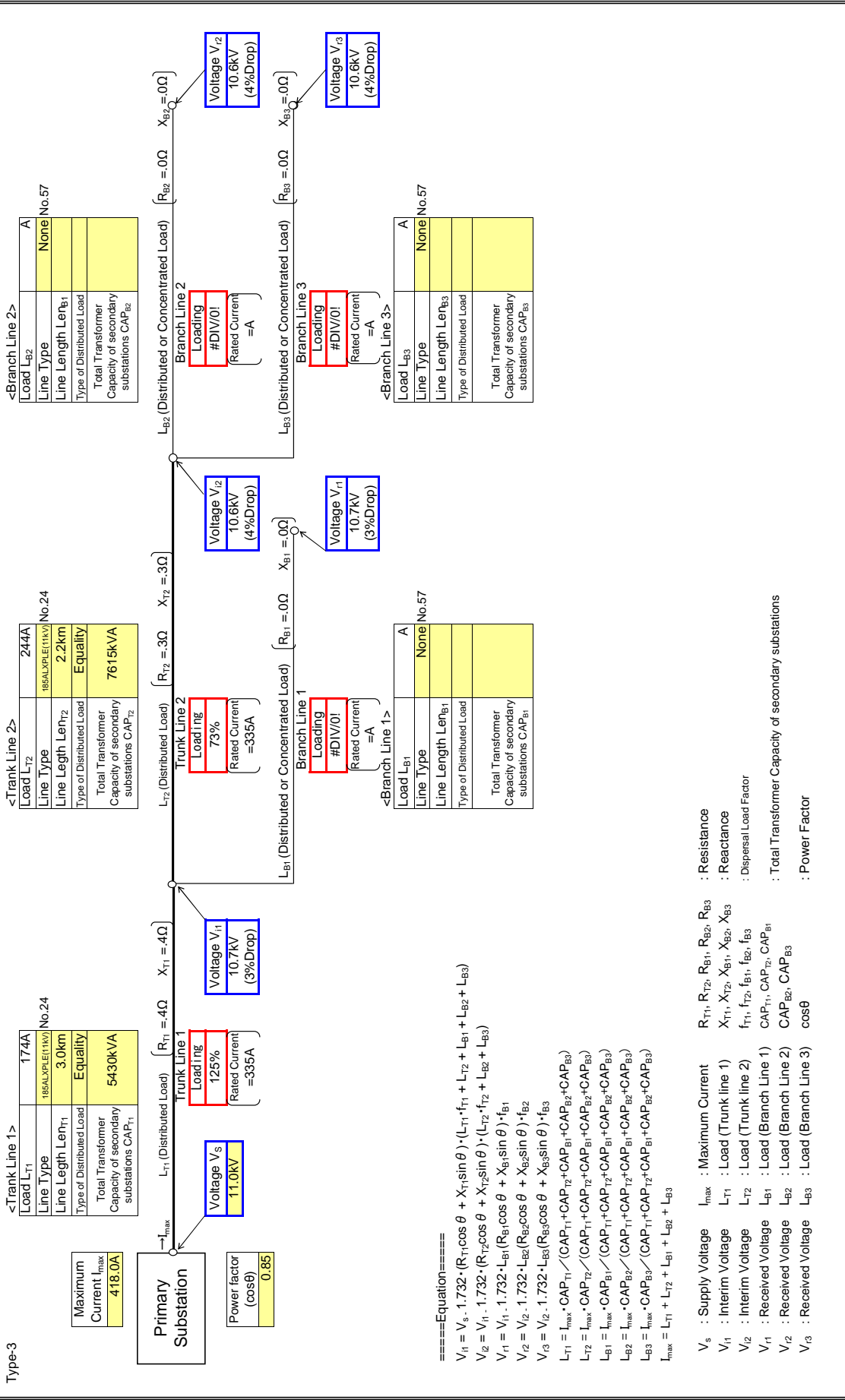
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

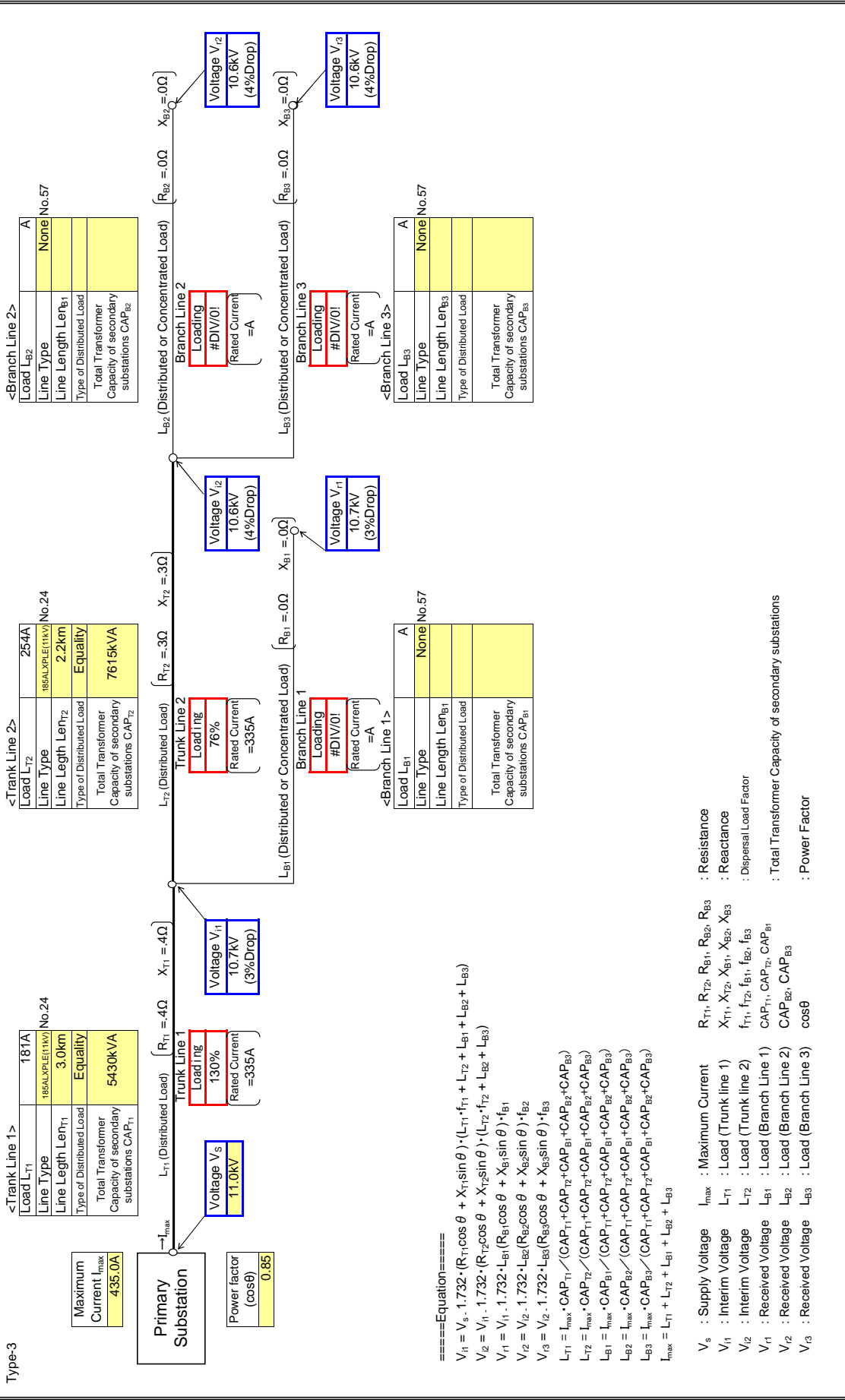
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

Input data in colored cells



====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

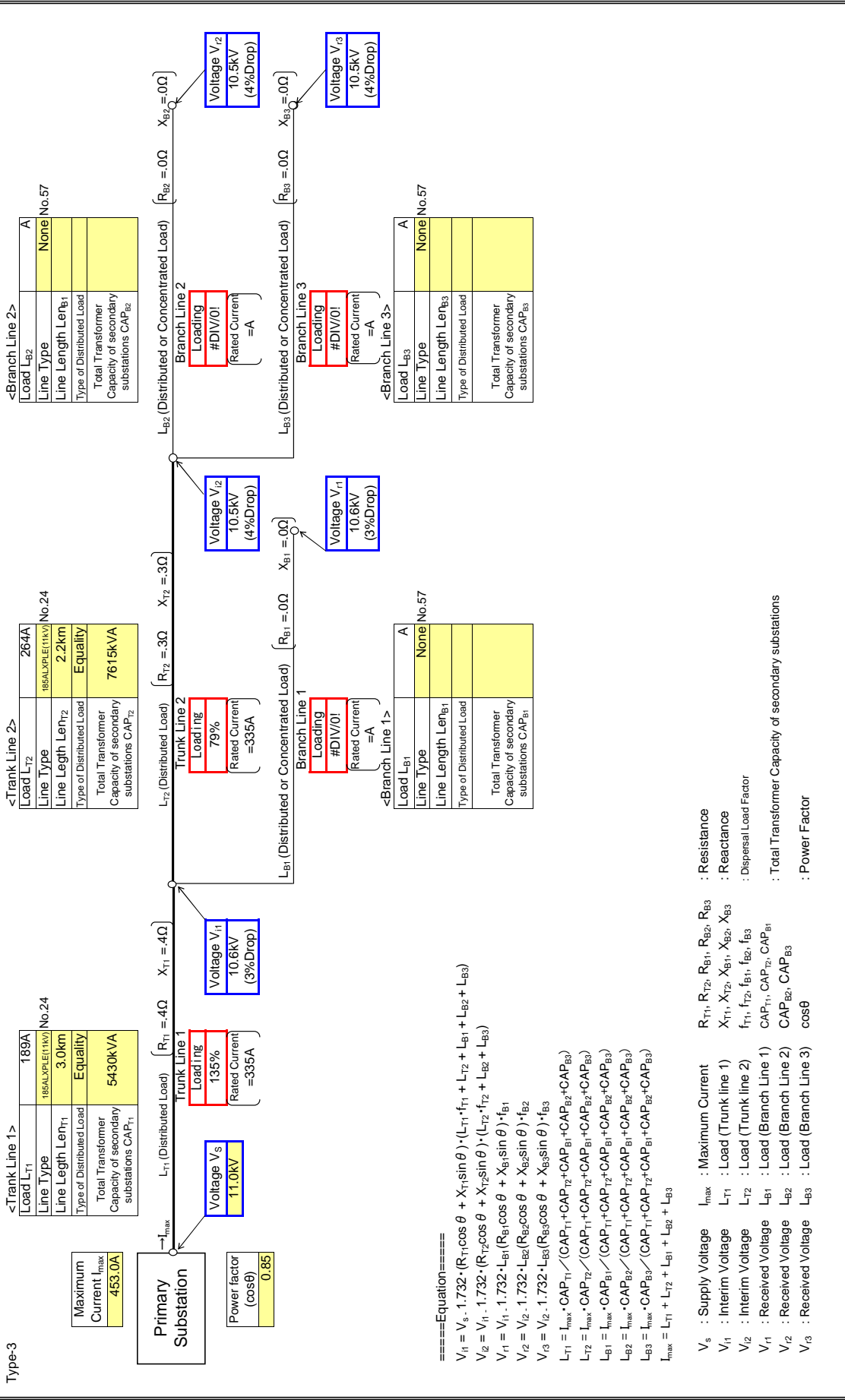
Legend:

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- L_{T1}, L_{T2} : Load (Trunk line 1)
- L_{B1}, L_{B2}, L_{B3} : Load (Branch line 1)
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

Input data in colored cells



====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

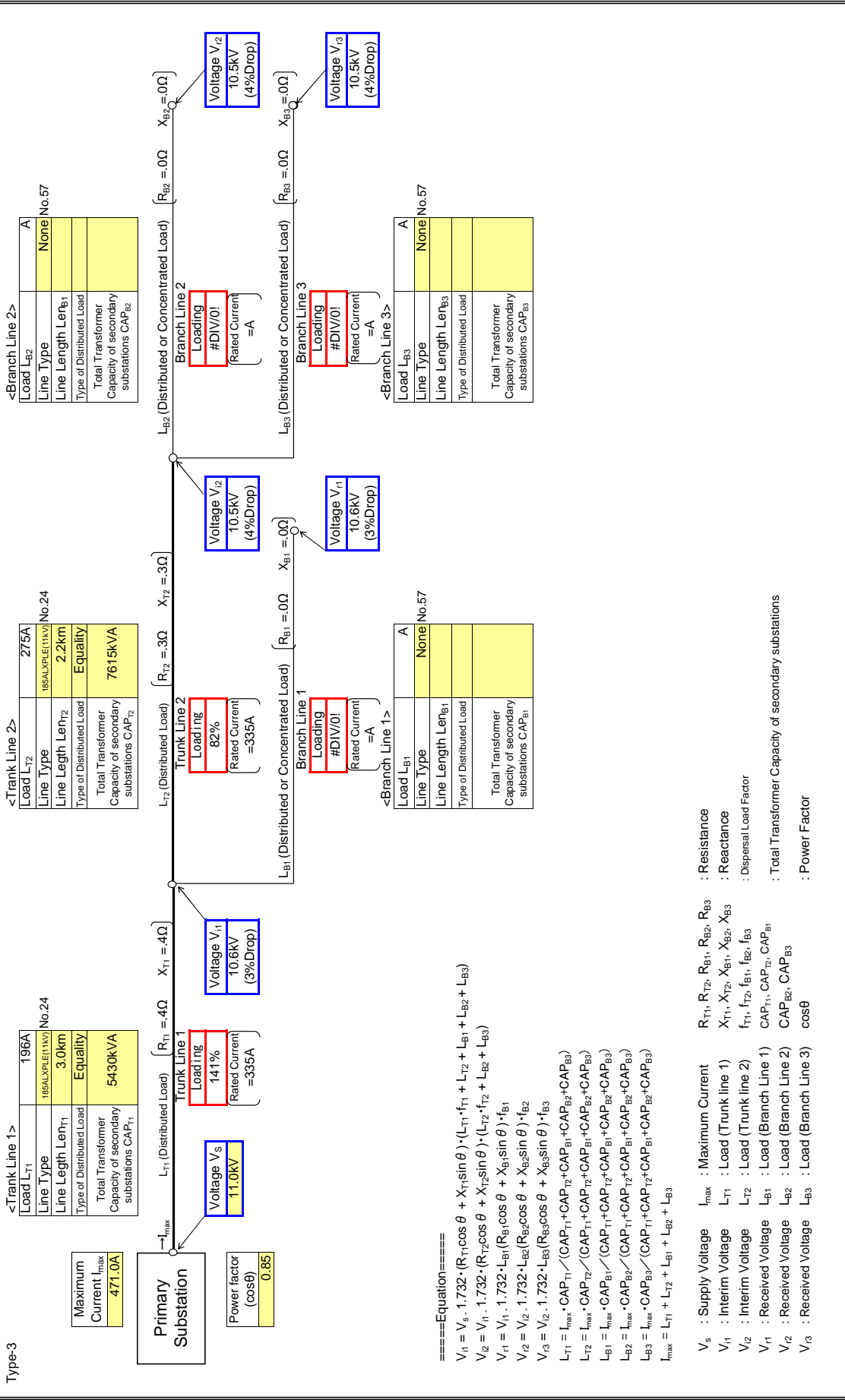
Legend:

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- L_{T1}, L_{T2} : Load (Trunk line 1), Load (Trunk line 2)
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1}, V_{r2}, V_{r3} : Received Voltage (Branch Line 1), (Branch Line 2), (Branch Line 3)
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

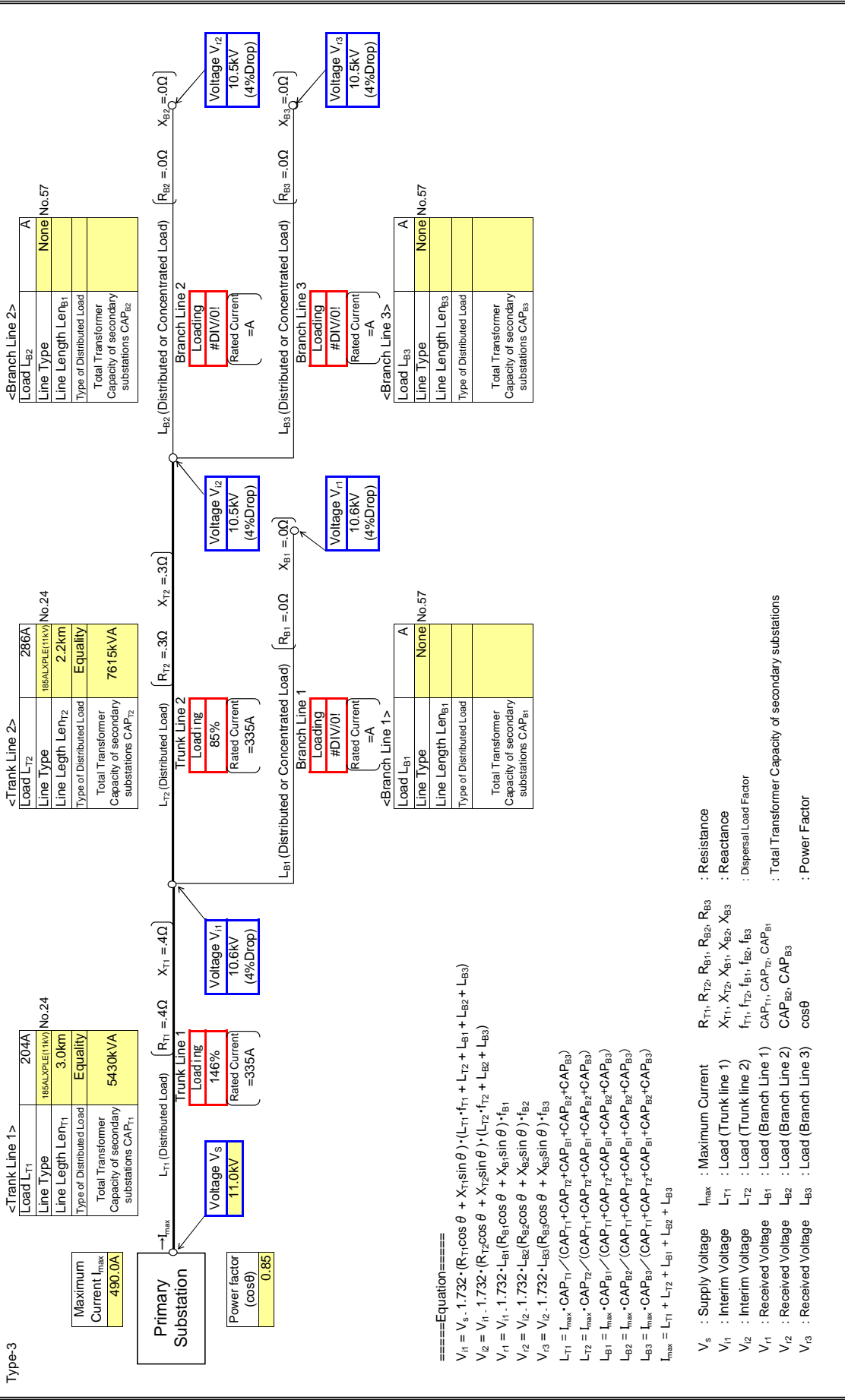
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E08

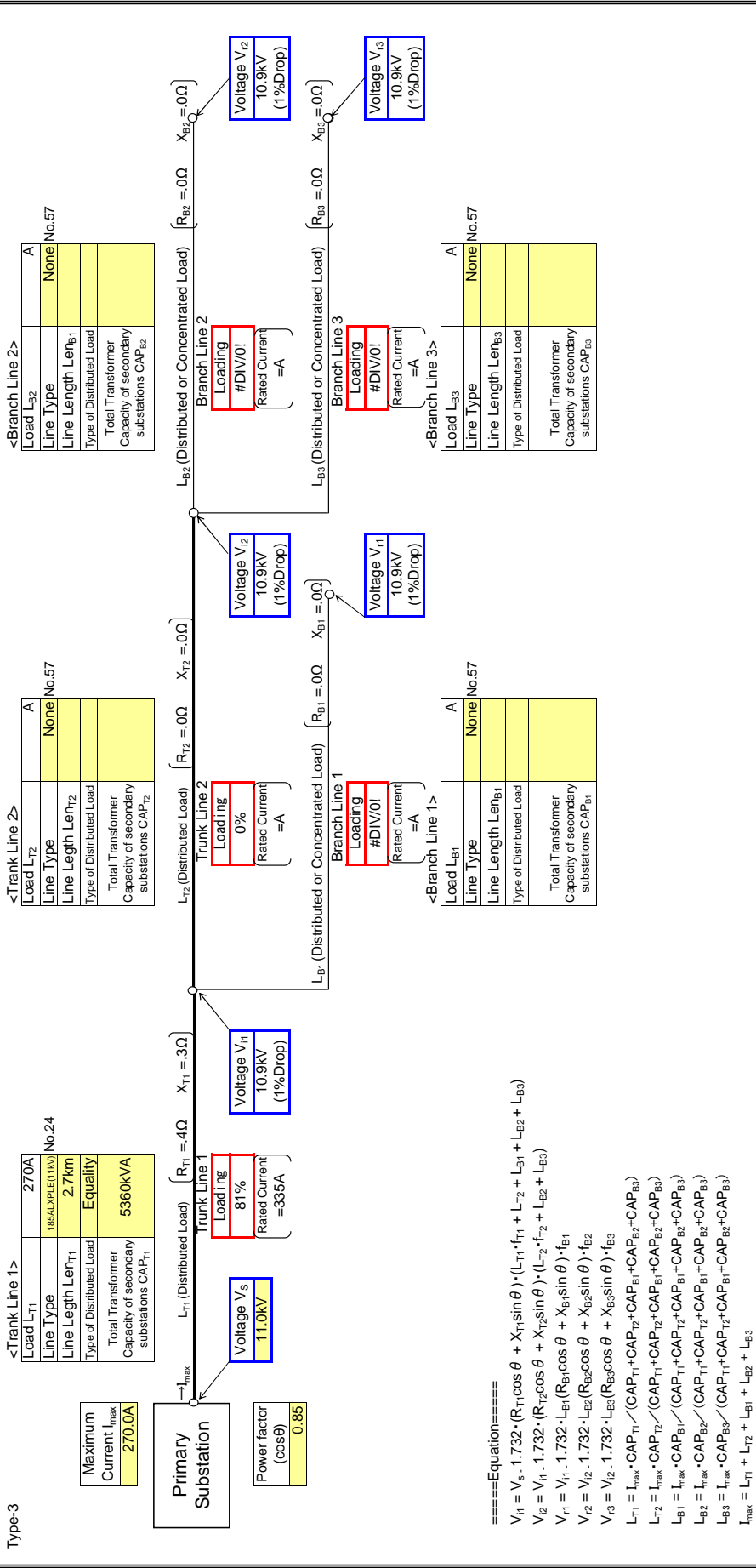
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

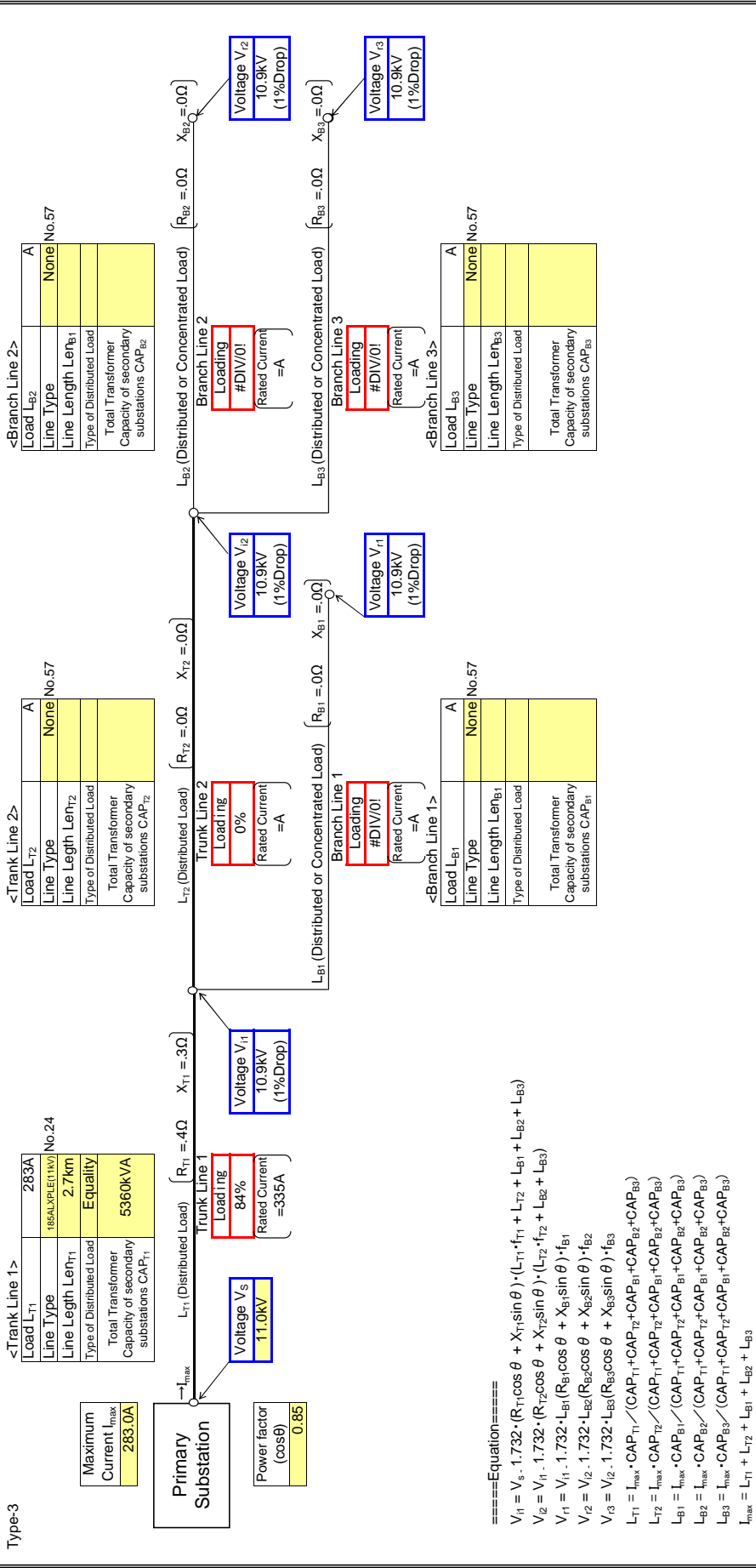
$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{r1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{r2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

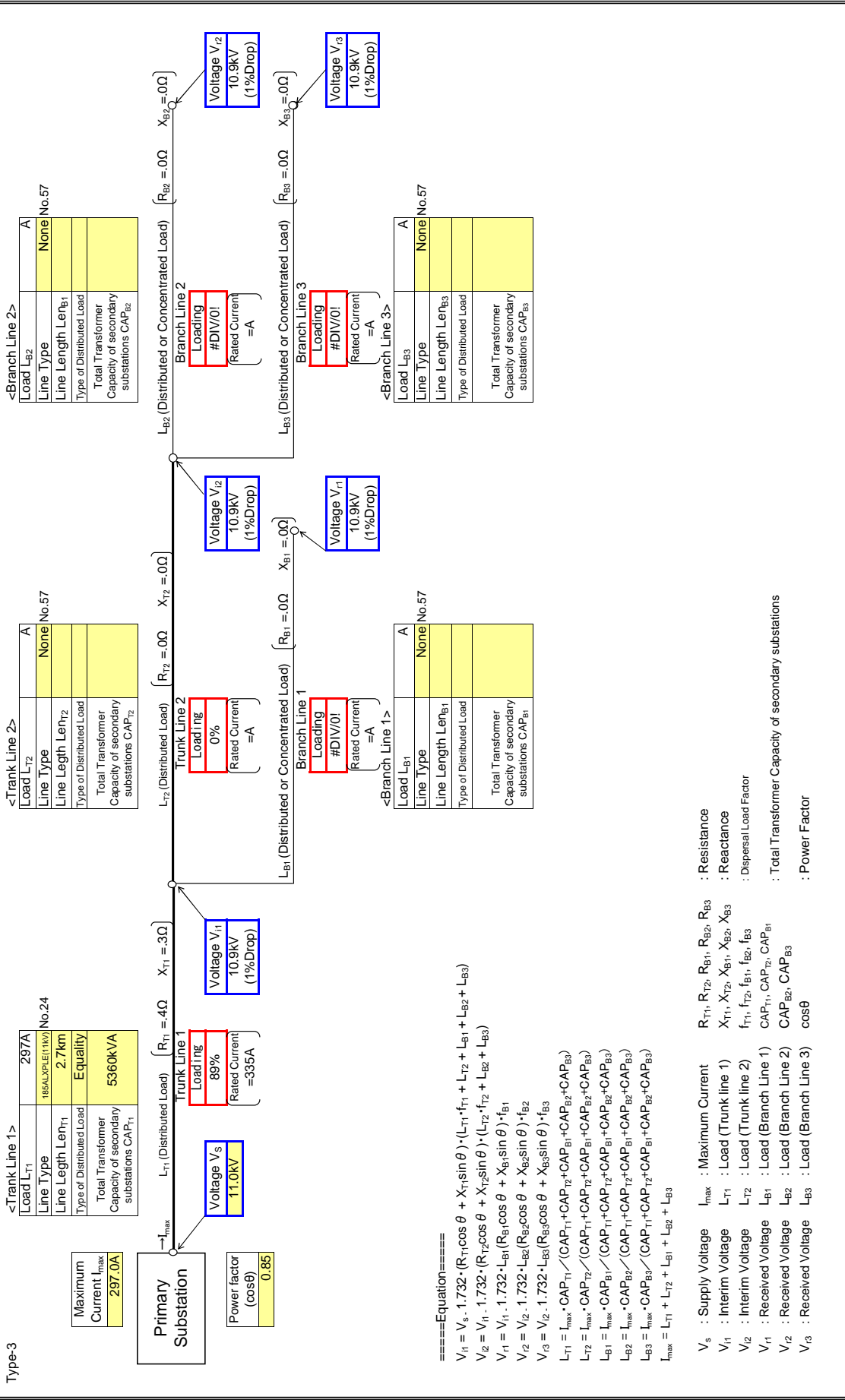
Legend:

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

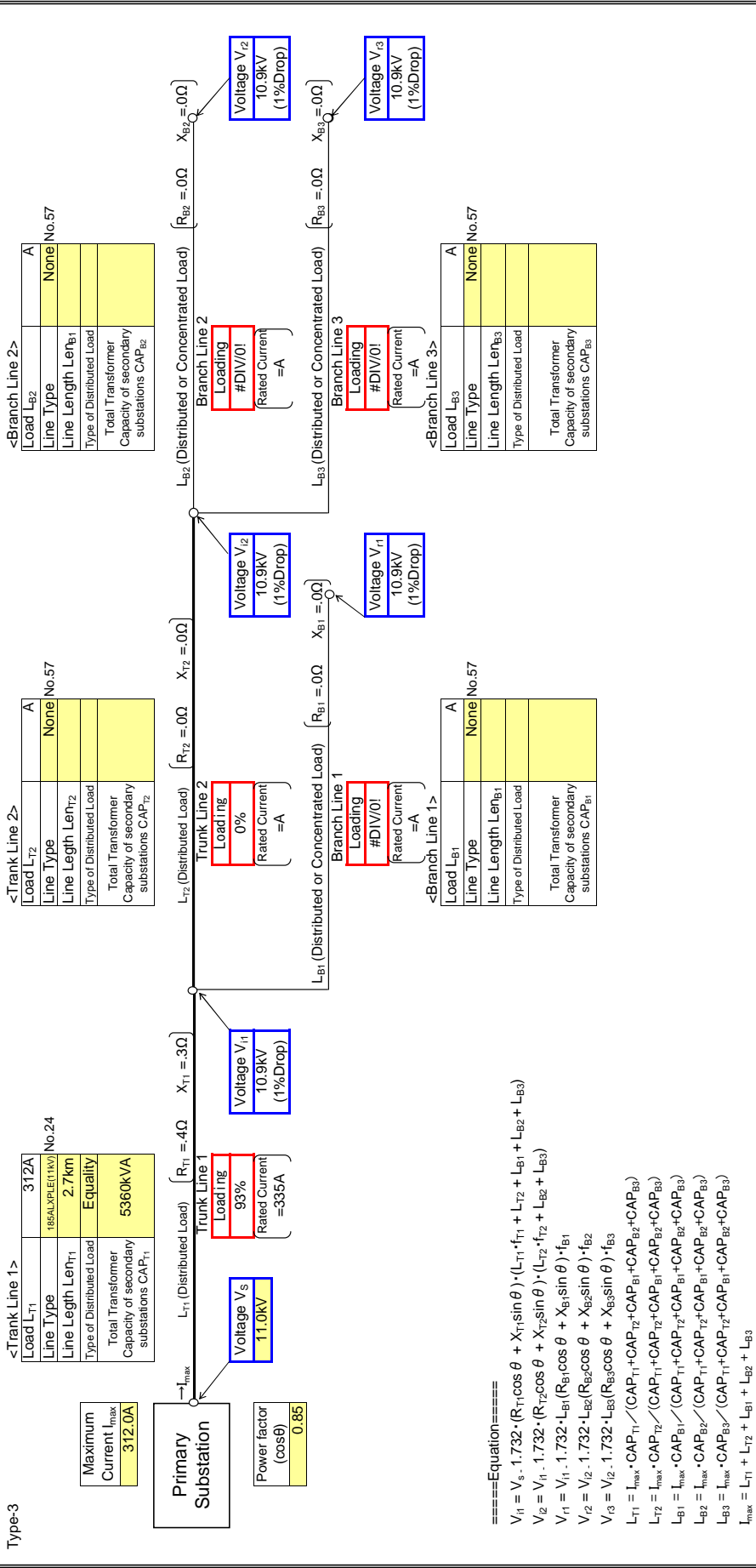
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

: Input data in colored cells

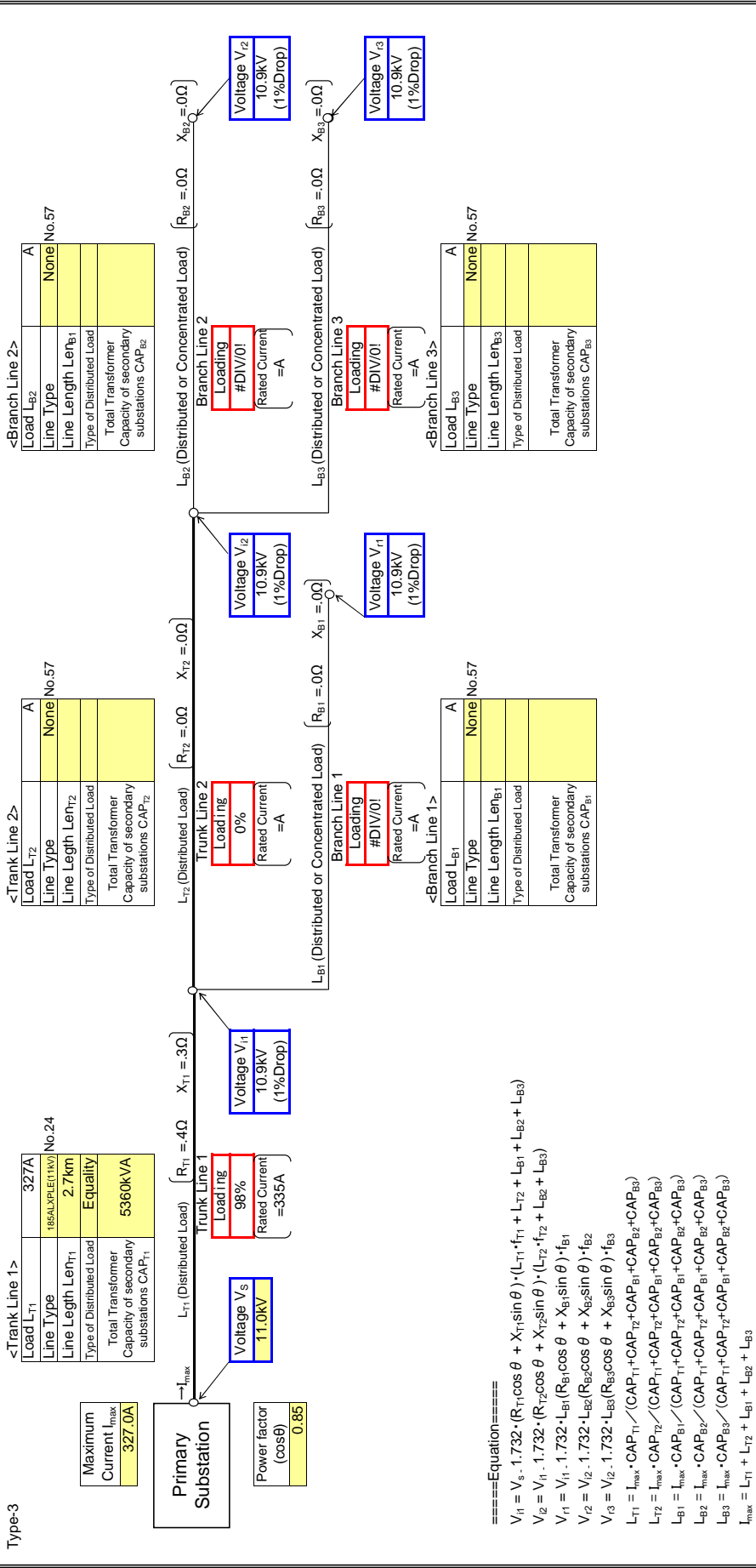


- ====Equation====
- $$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$
- $$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$
- $$V_{i3} = V_{i2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$
- $$V_{i4} = V_{i3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$
- $$V_{i5} = V_{i4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$
- $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{i1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{i2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{i3} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{i4} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{i5} : Received Voltage L_{B3} : Load (Branch Line 3)

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

Input data in colored cells



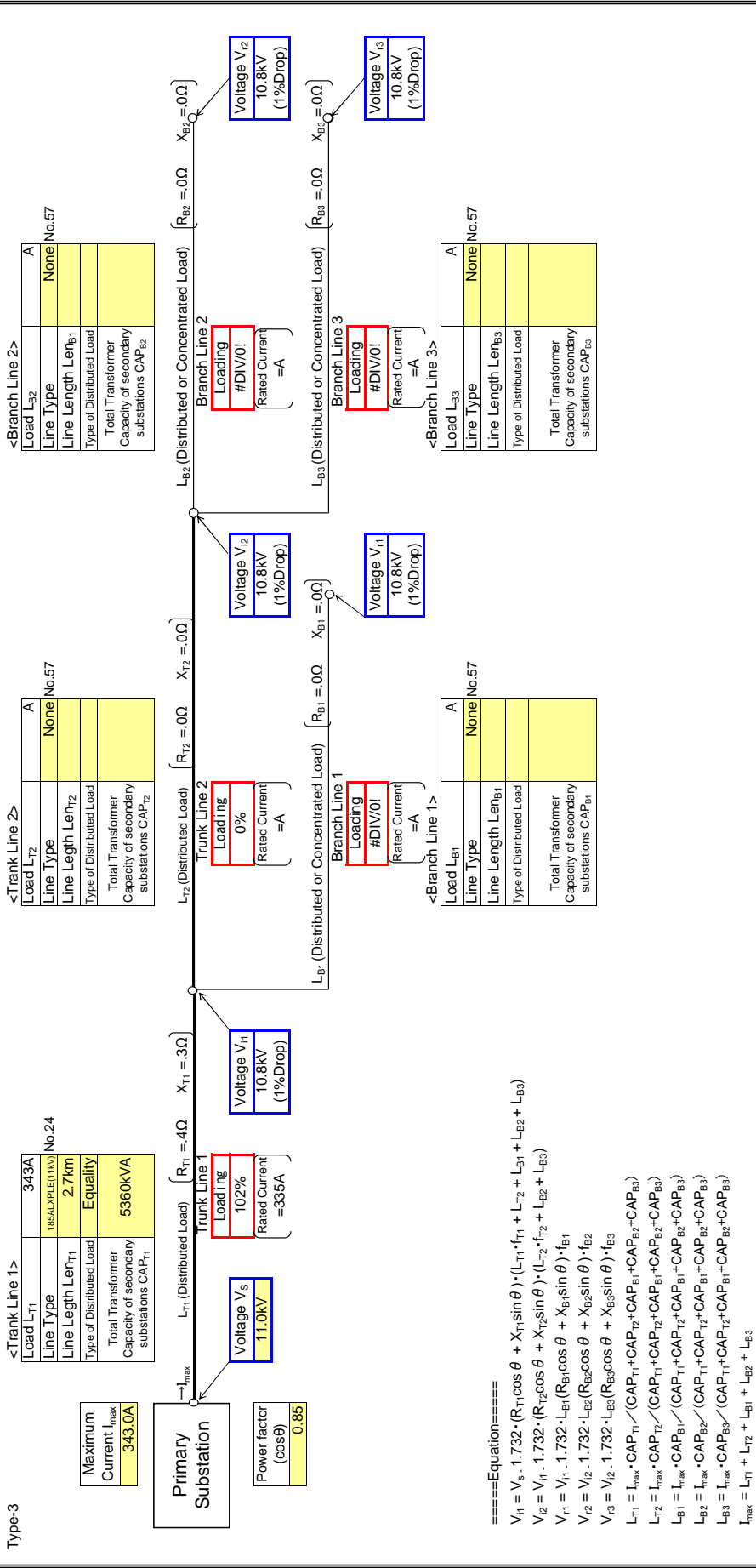
====Equation====
 $V_{11} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{12} = V_{11} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{11} = V_{11} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{12} = V_{12} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{13} = V_{12} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$
 $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{11} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{12} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{11} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{12} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{13} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

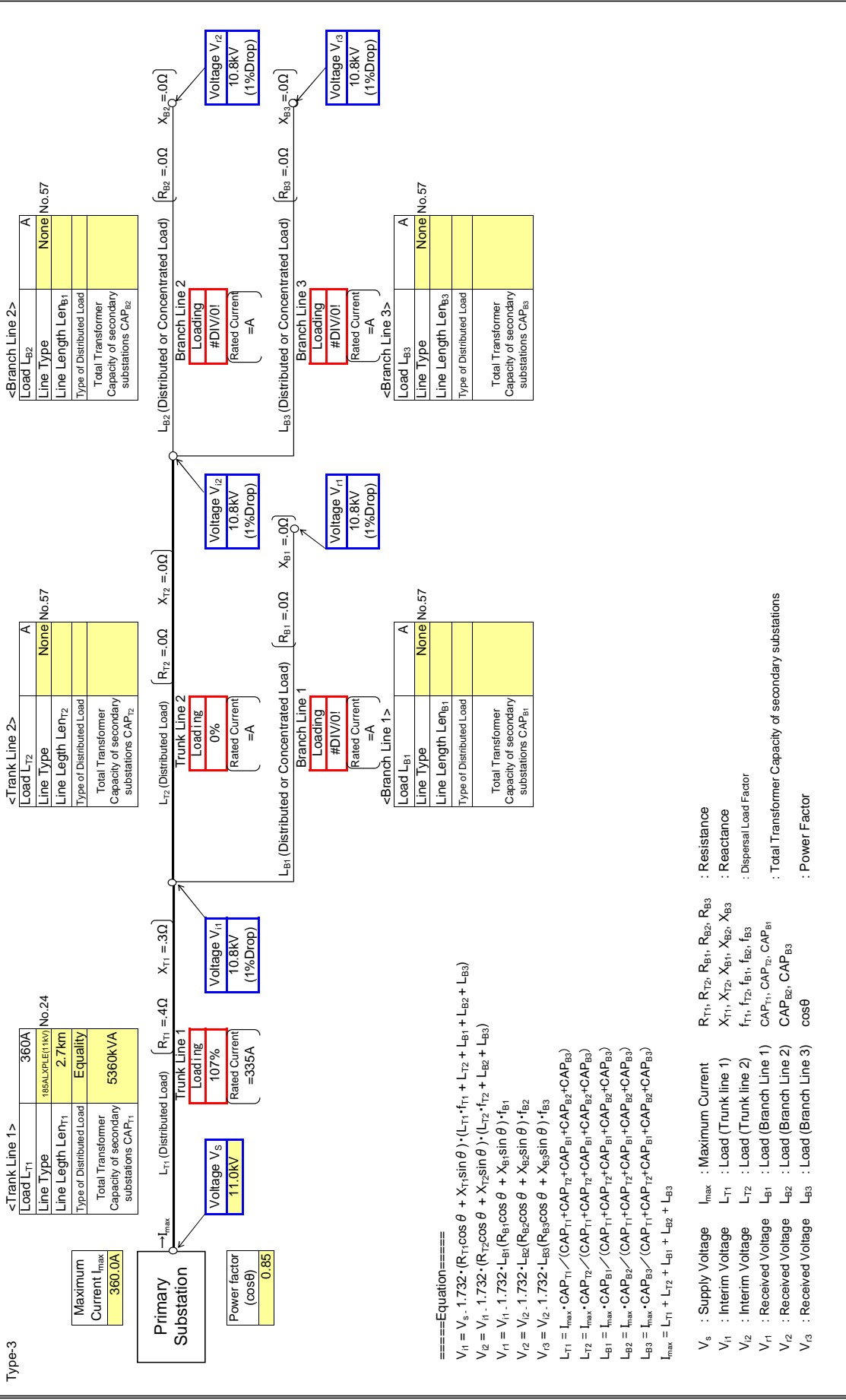
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

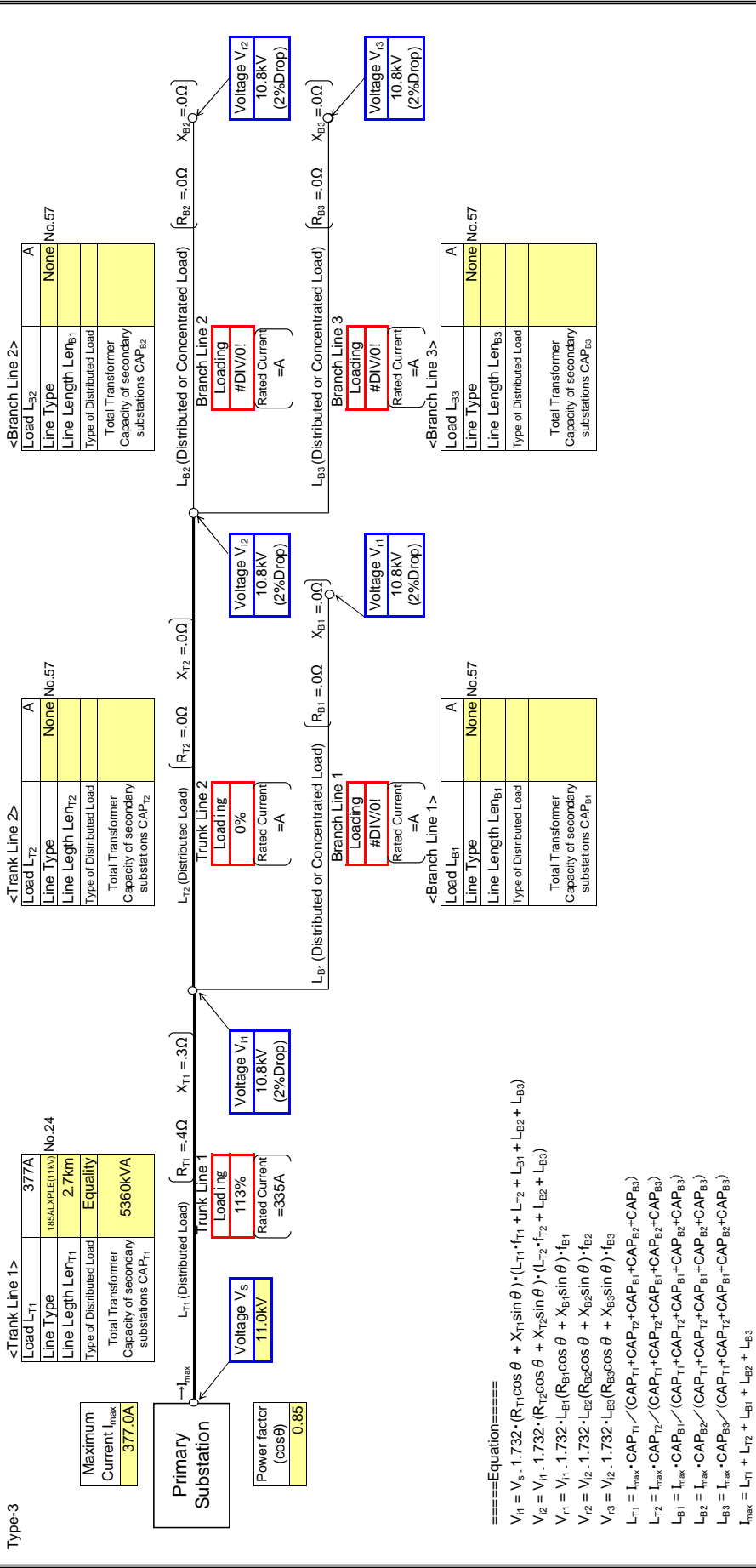
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

Input data in colored cells

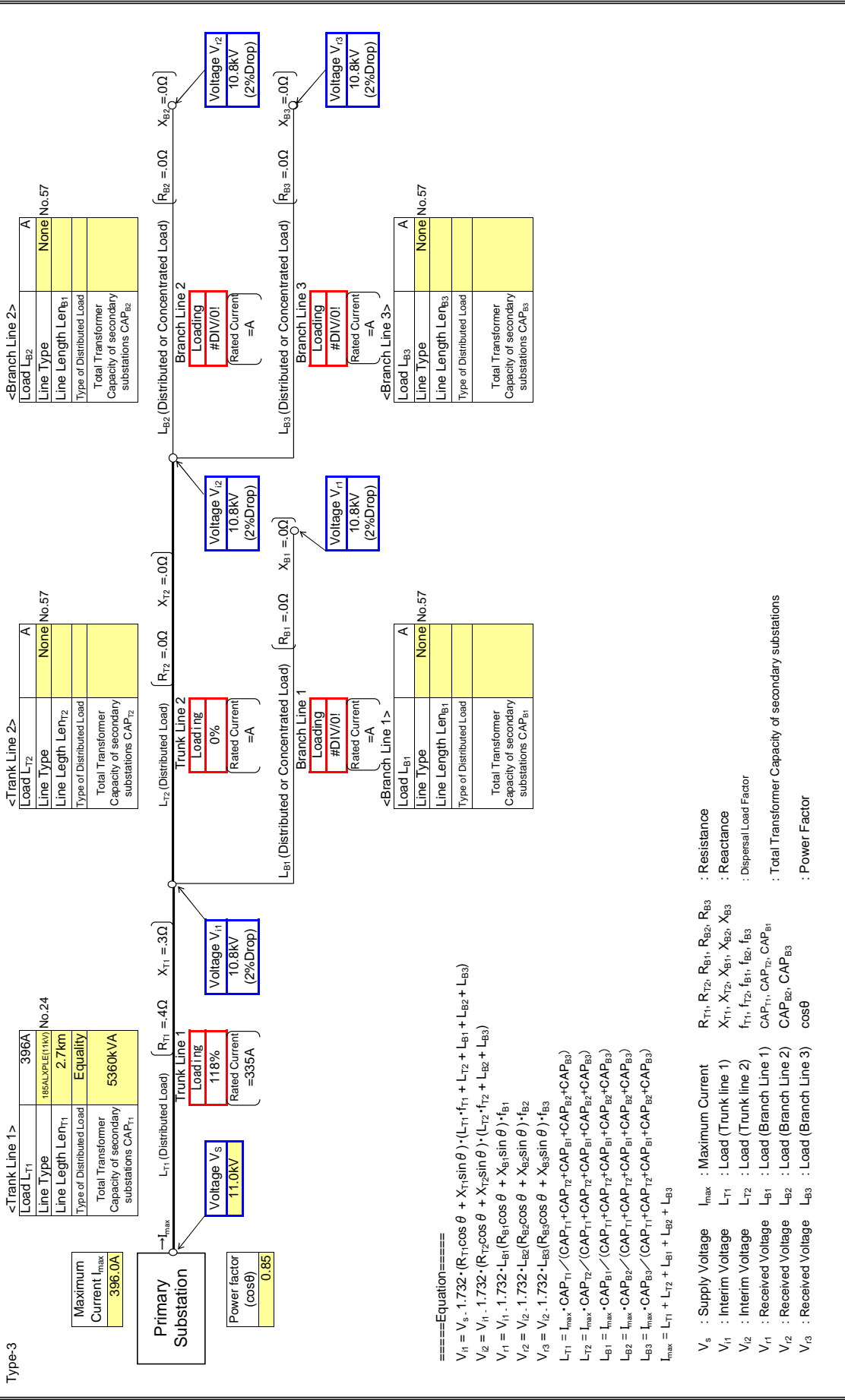


- V_s : Supply Voltage
- V_{i1} : Interim Voltage
- V_{i2} : Interim Voltage
- V_{r1} : Received Voltage
- V_{r2} : Received Voltage
- V_{r3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos\theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

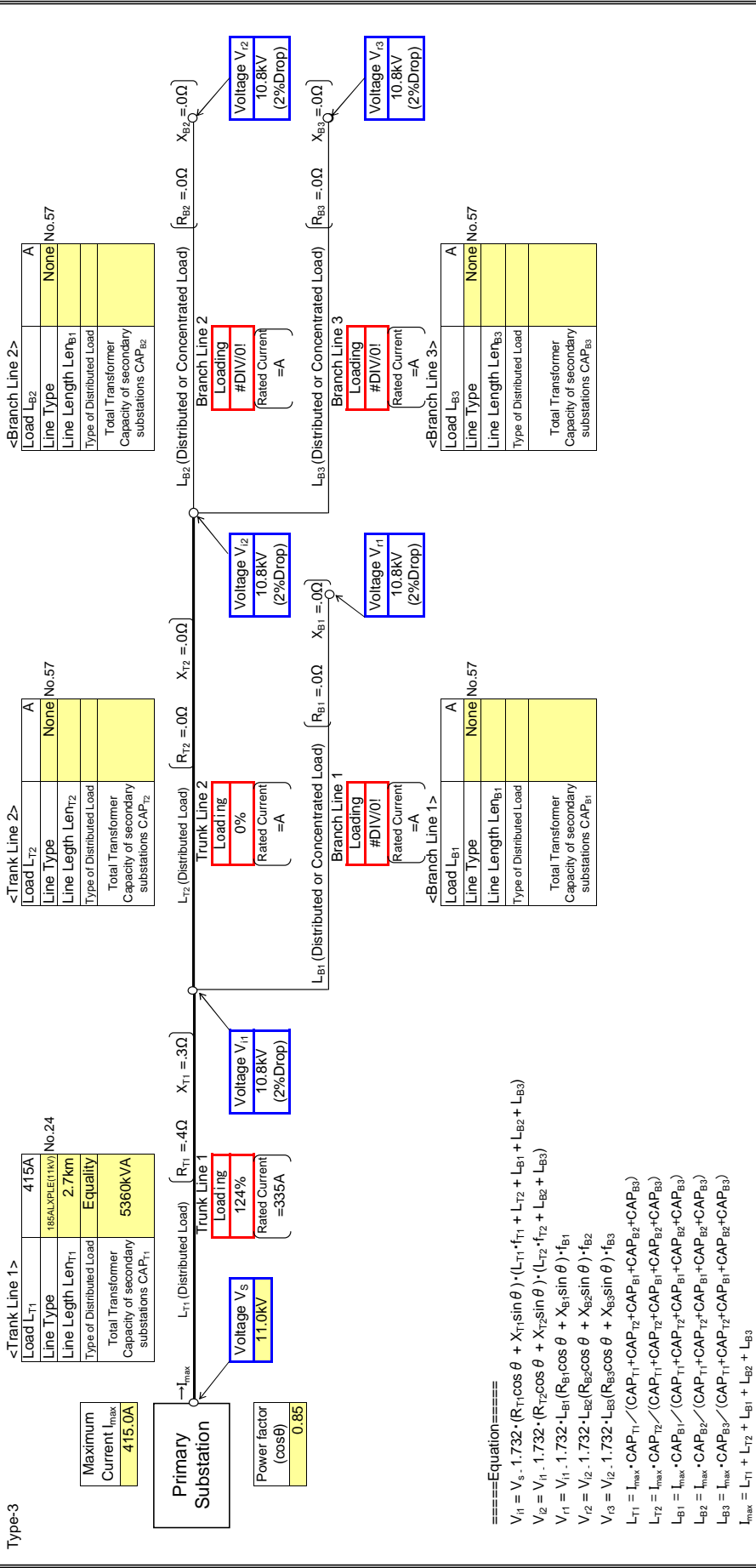
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

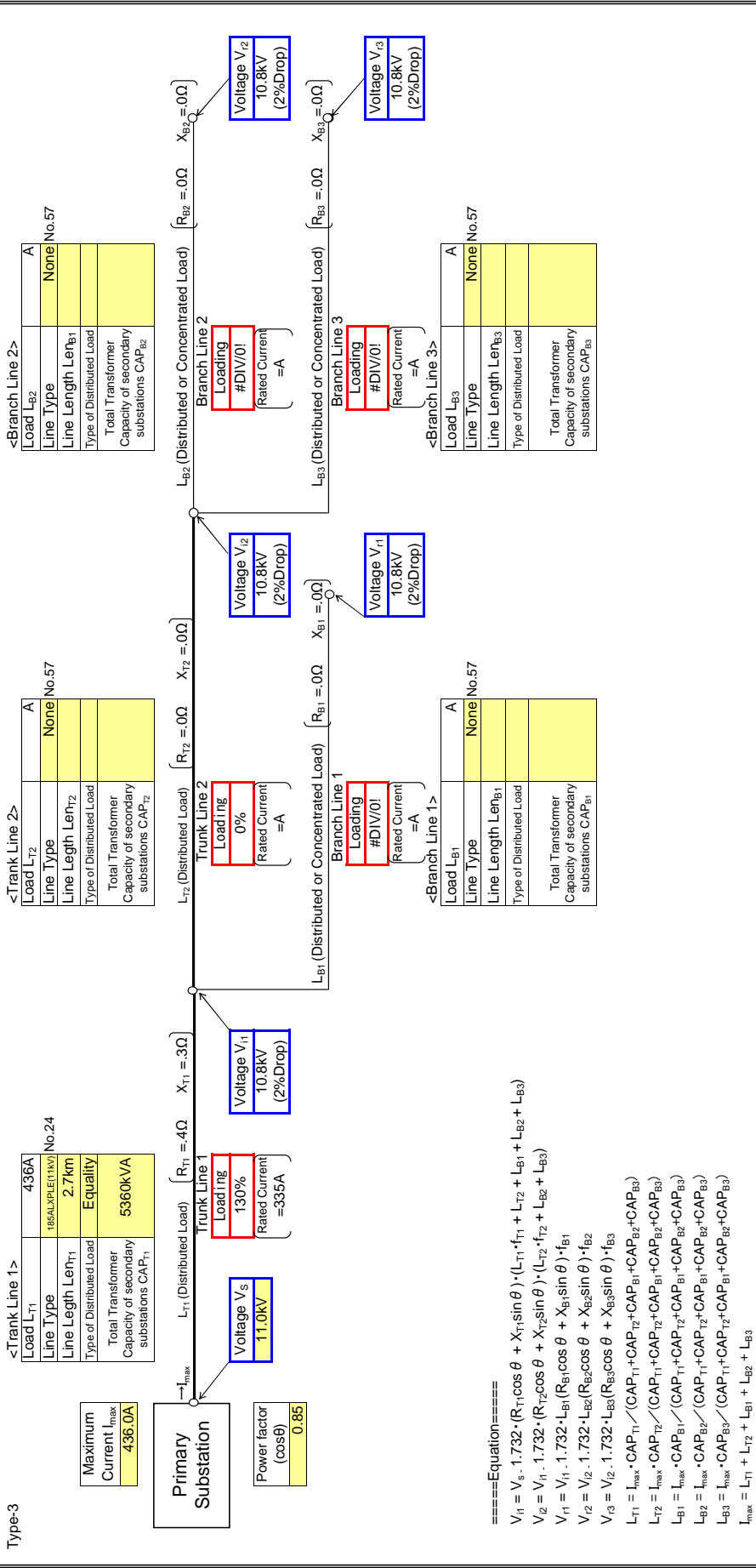
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

: Input data in colored cells

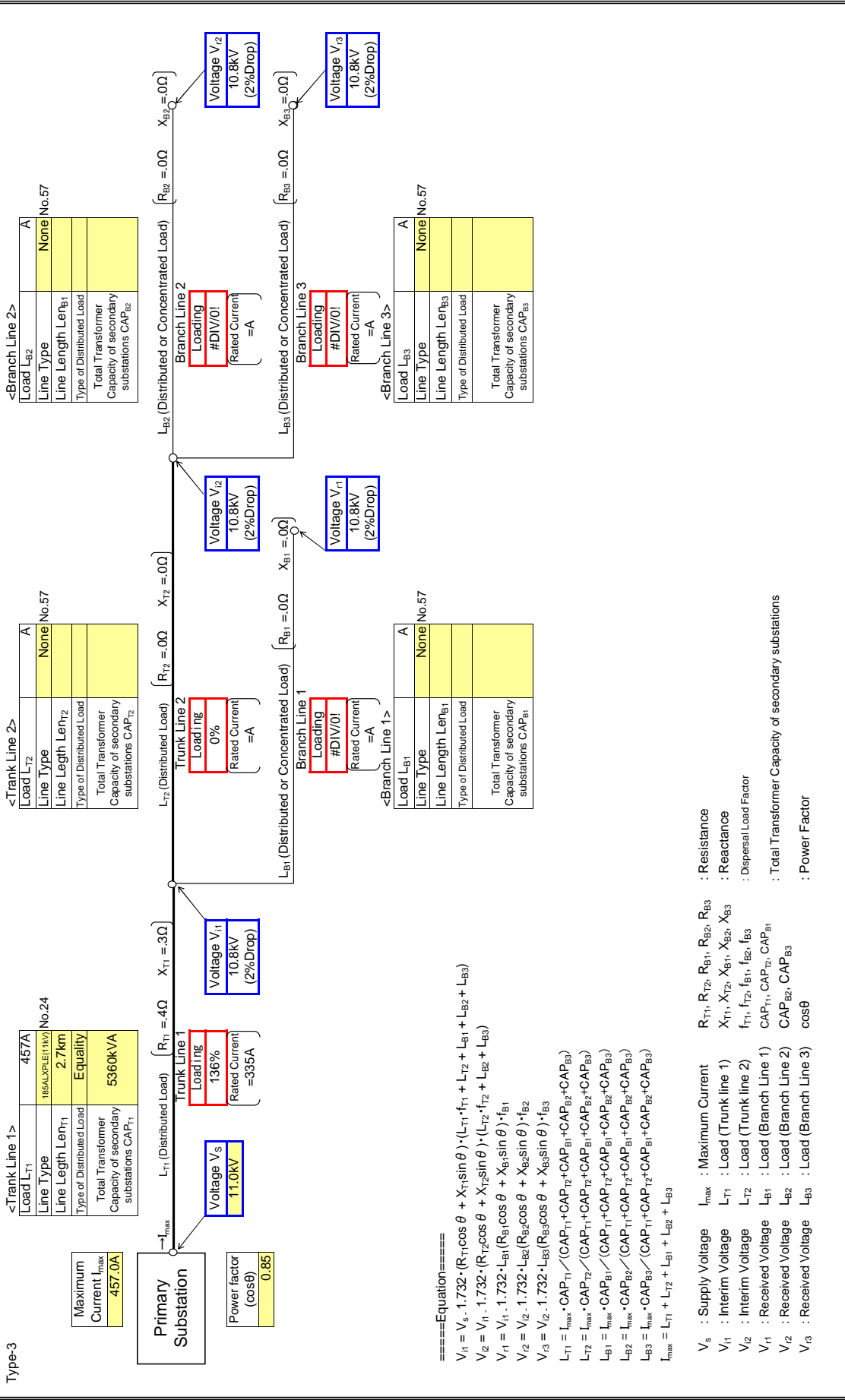


- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- CAP_{B2}, CAP_{B3} : Power Factor
- $cos\theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E150

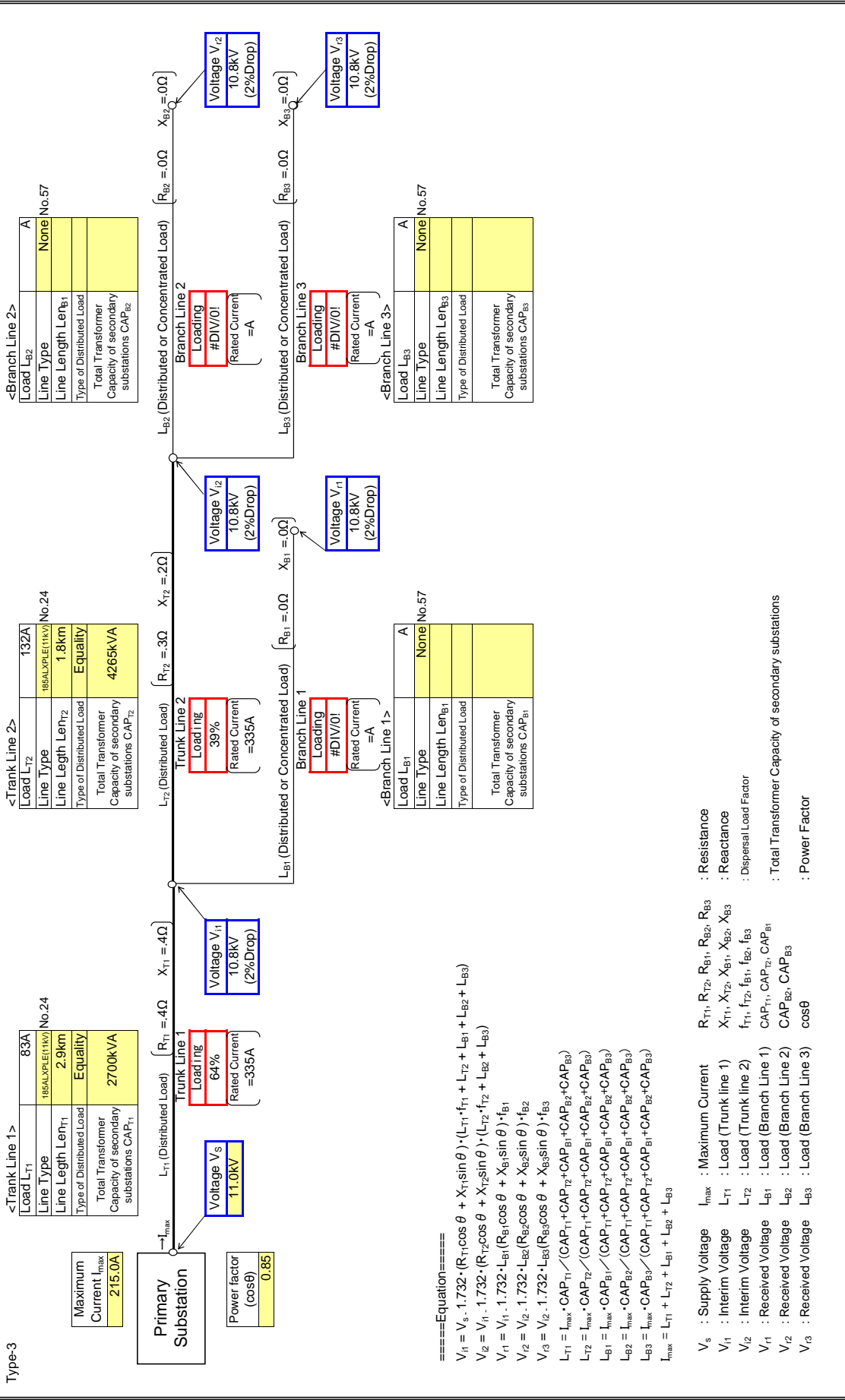
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

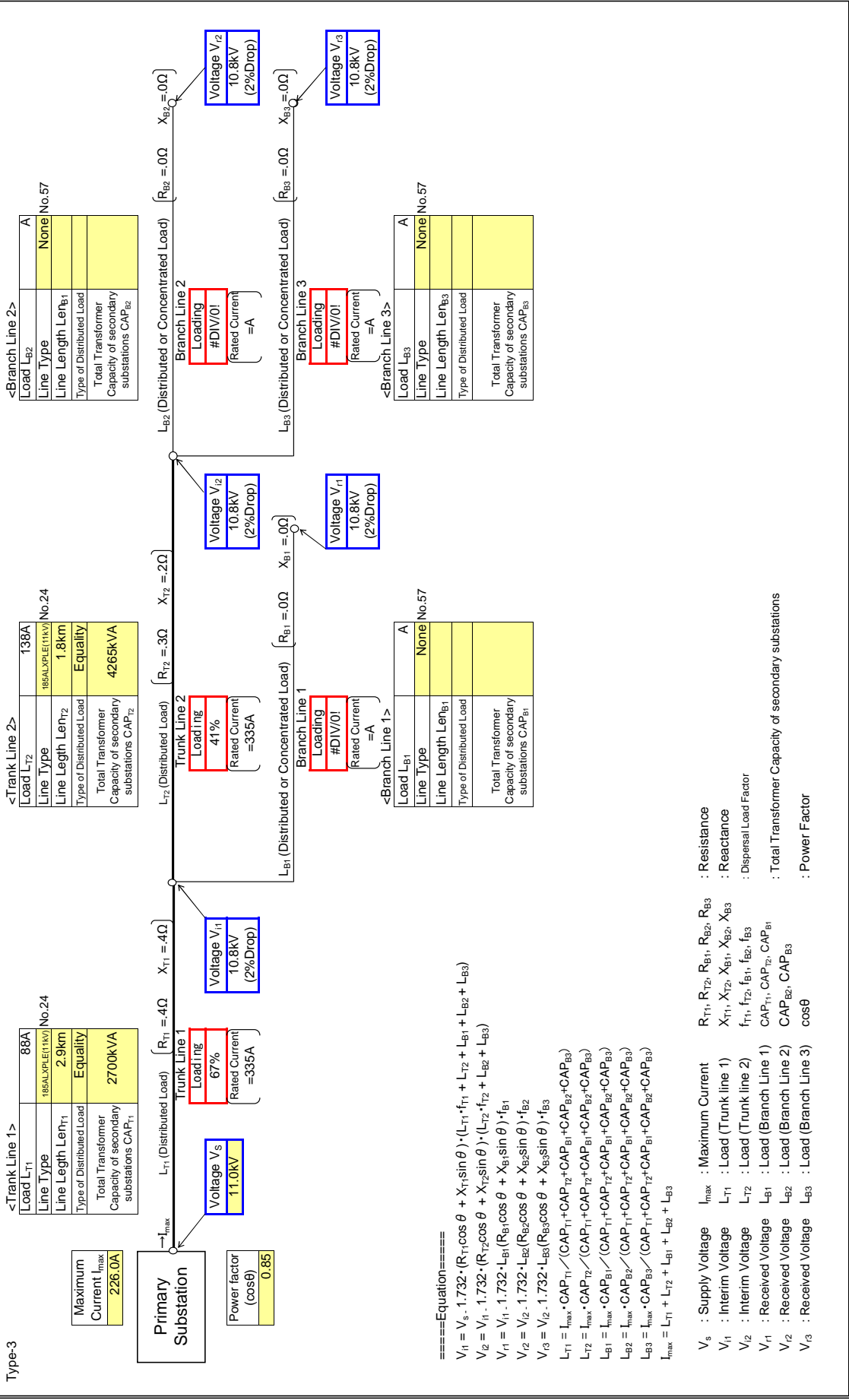
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

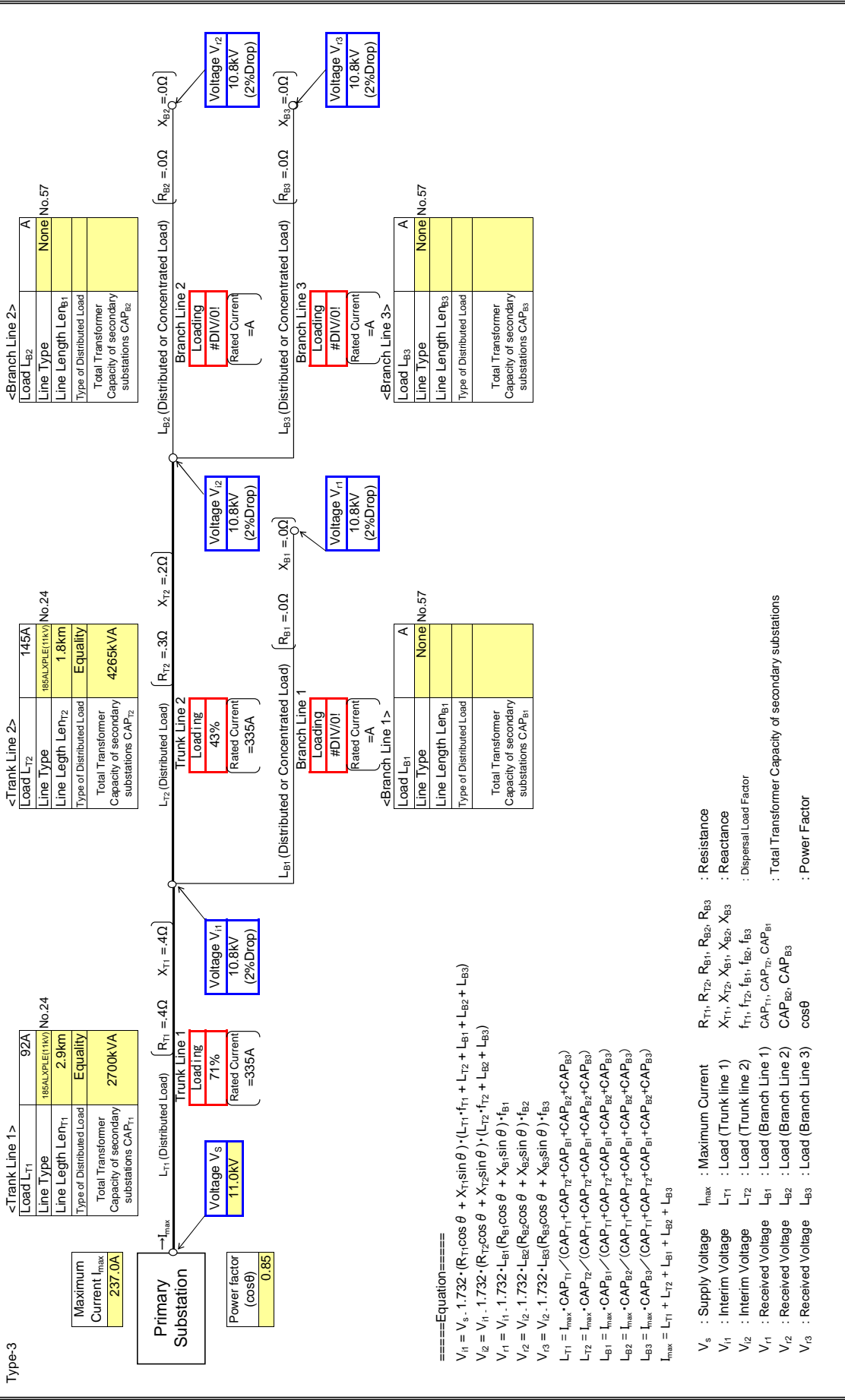
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

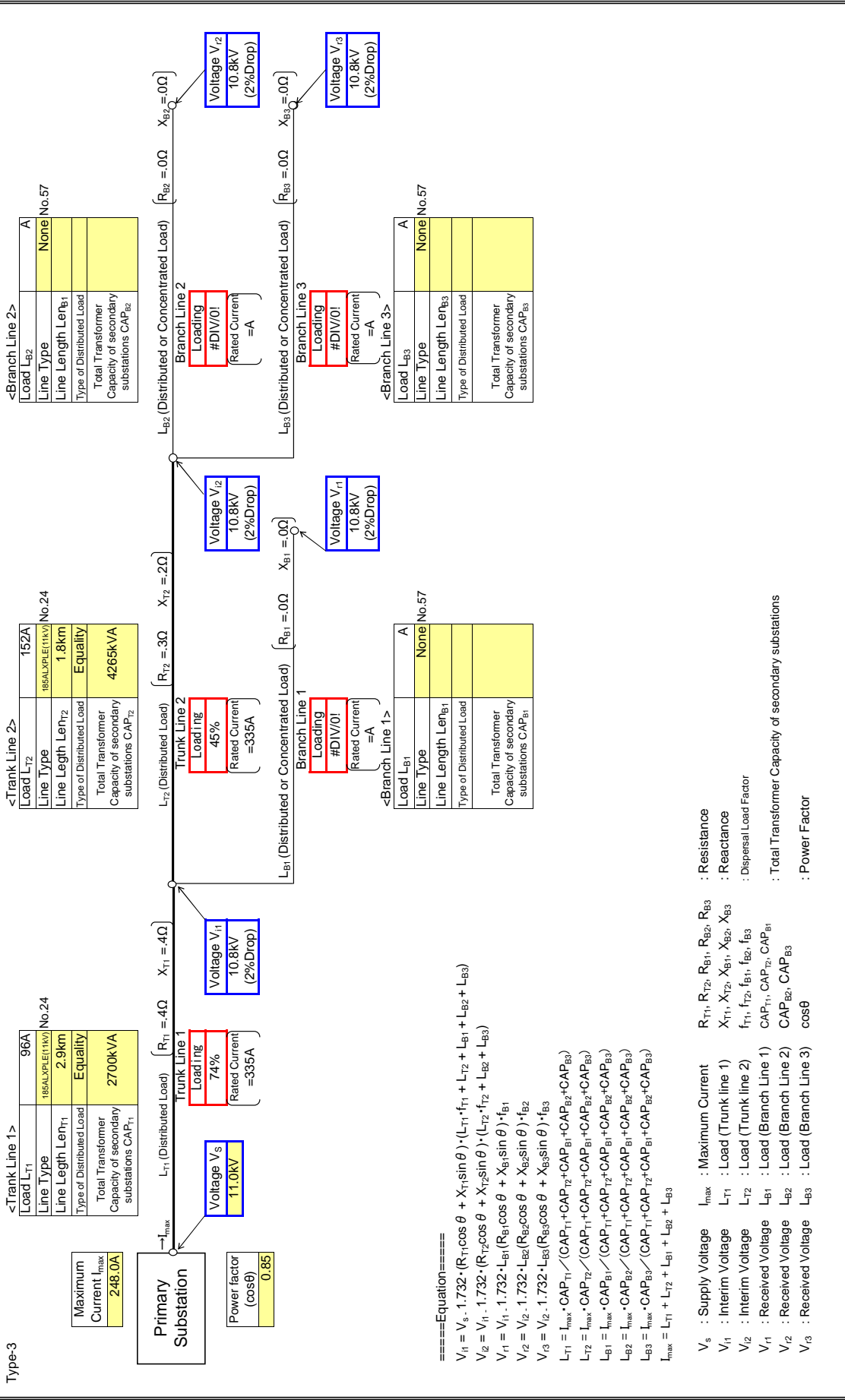
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

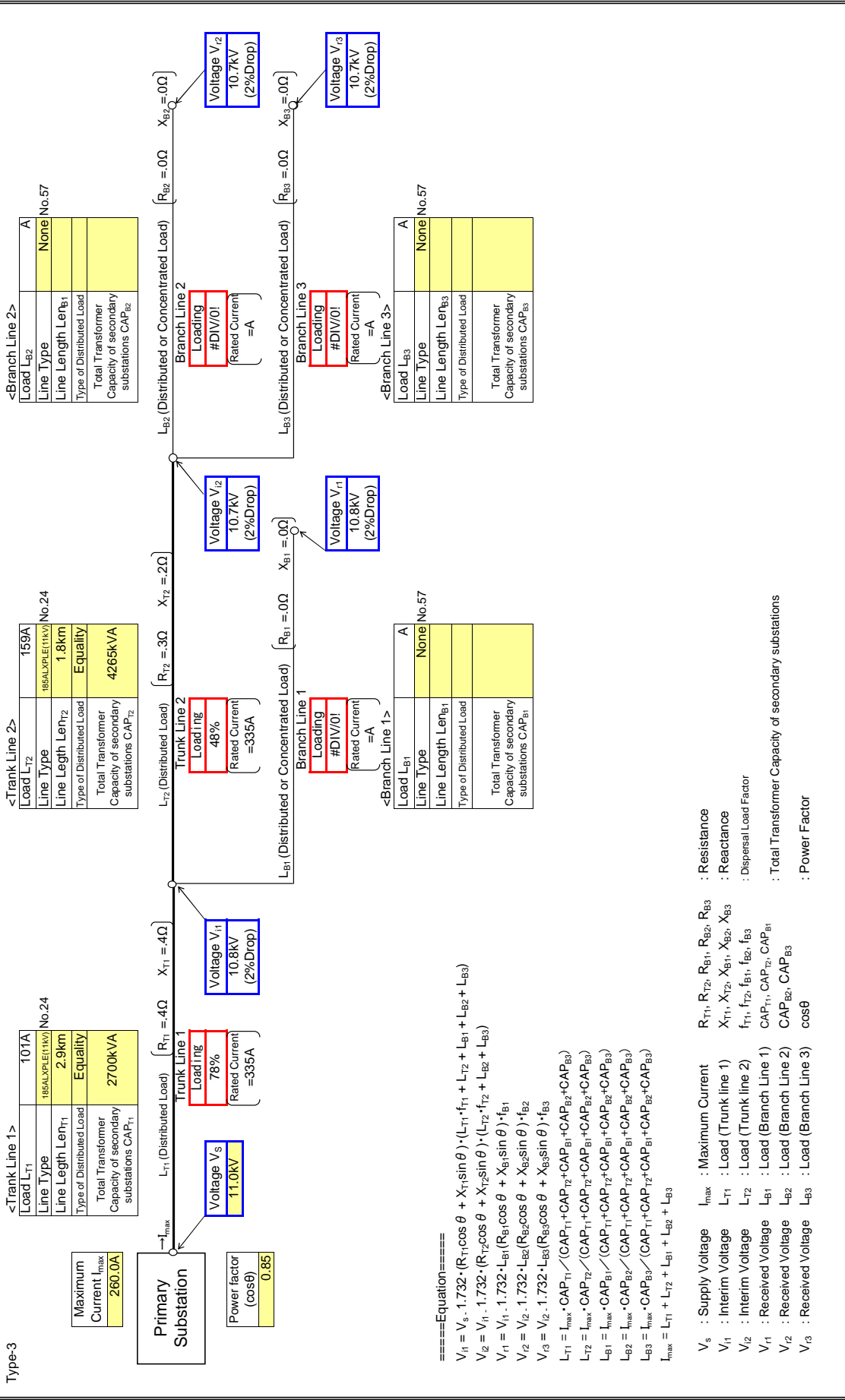
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

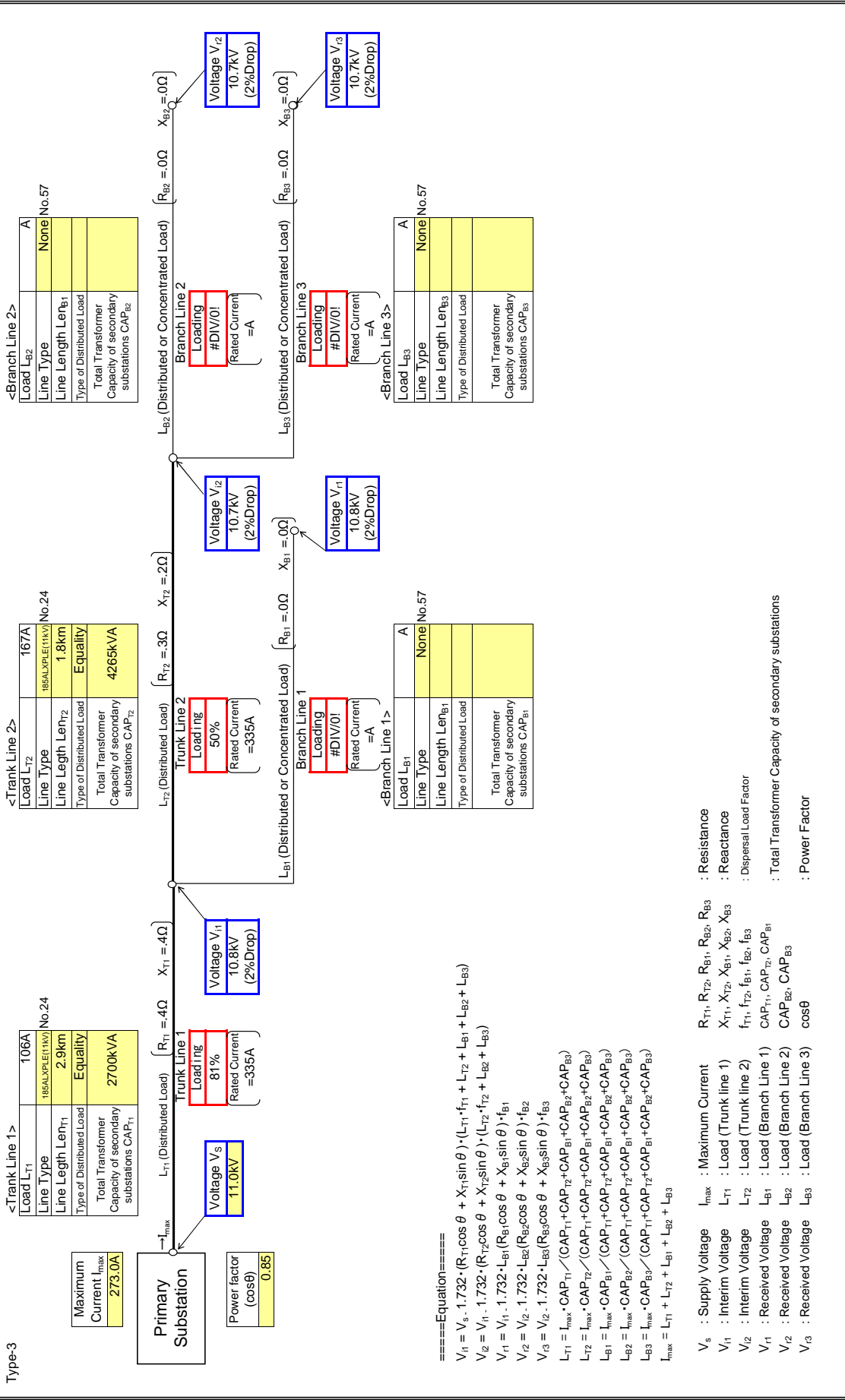
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

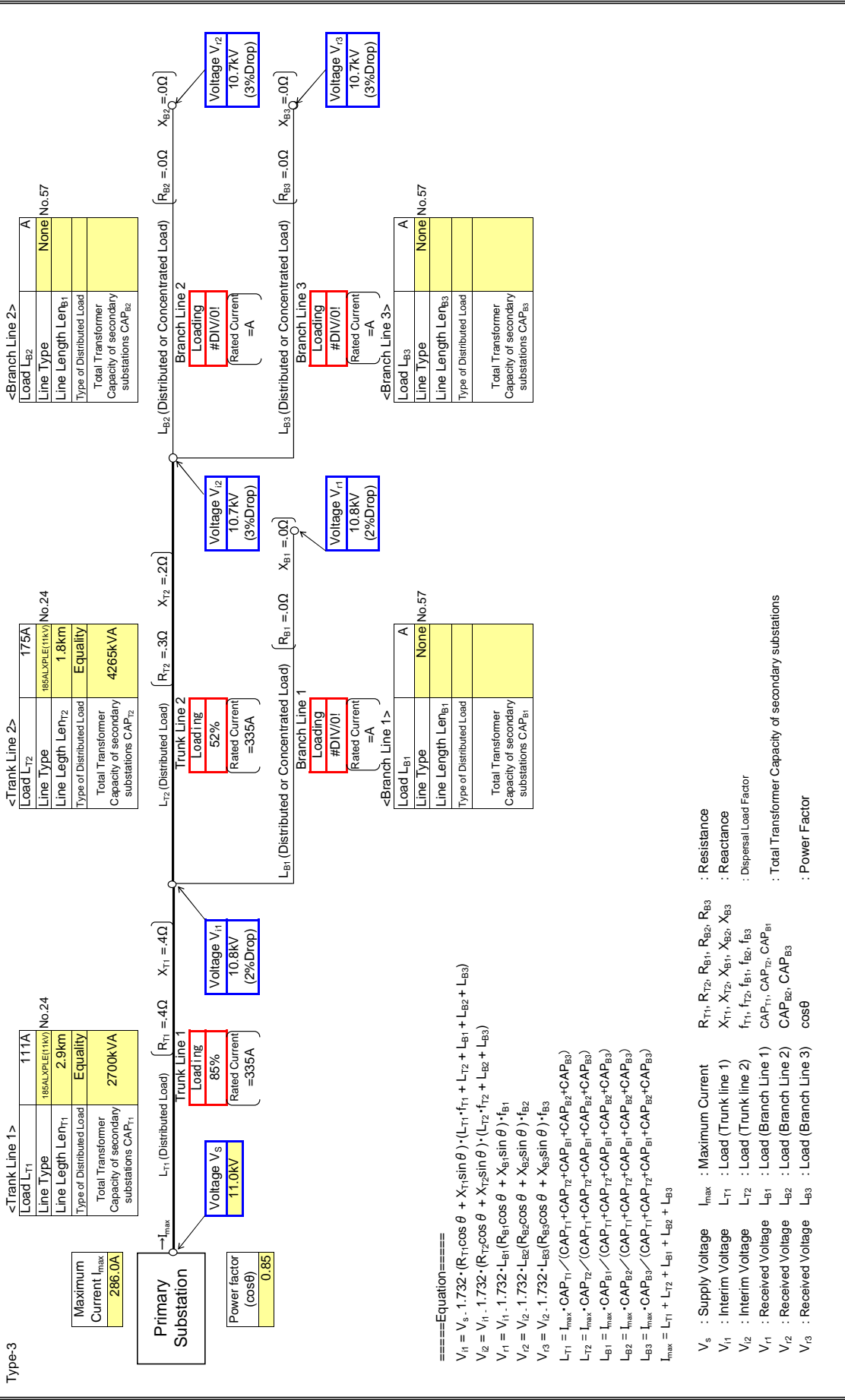
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

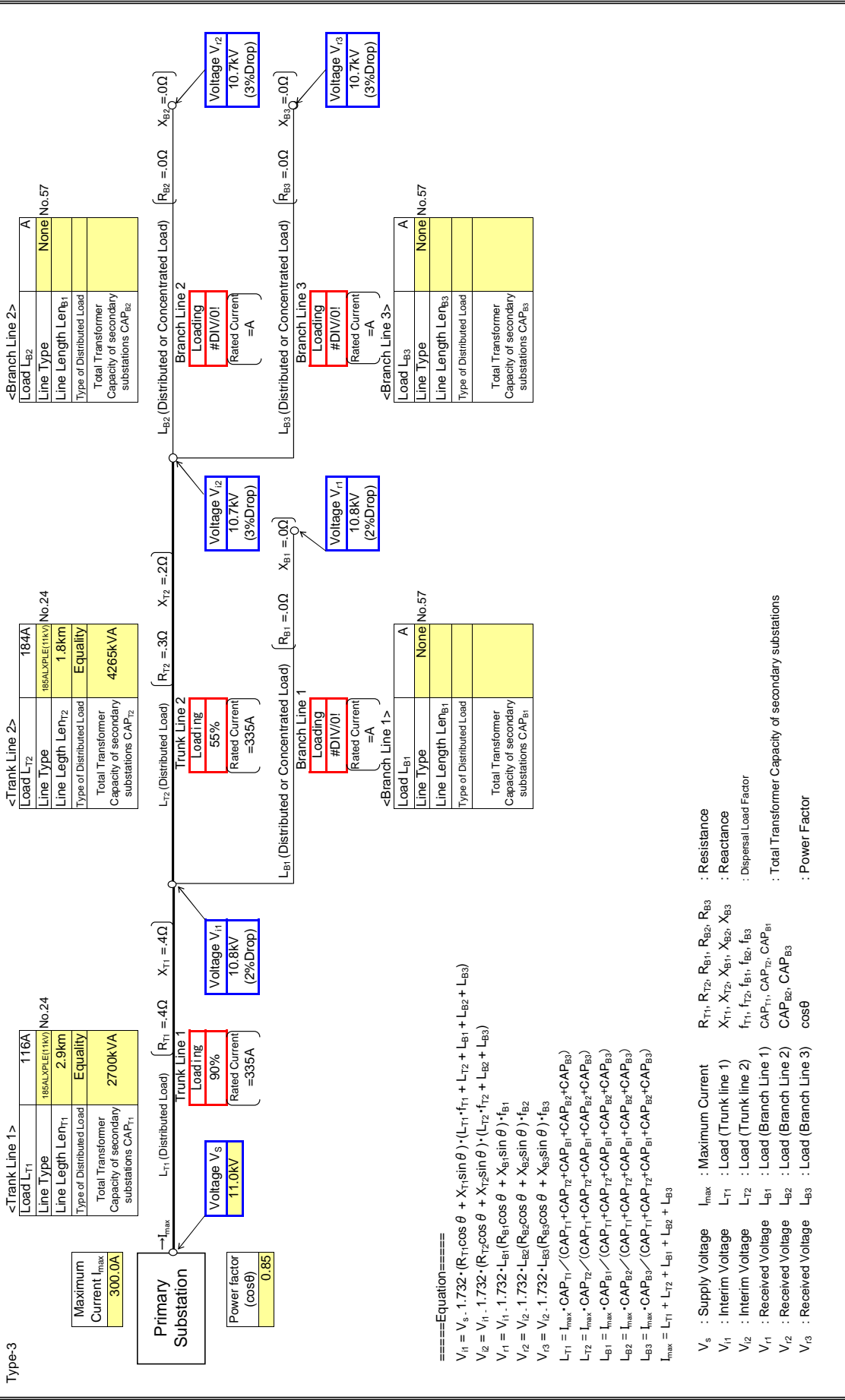
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

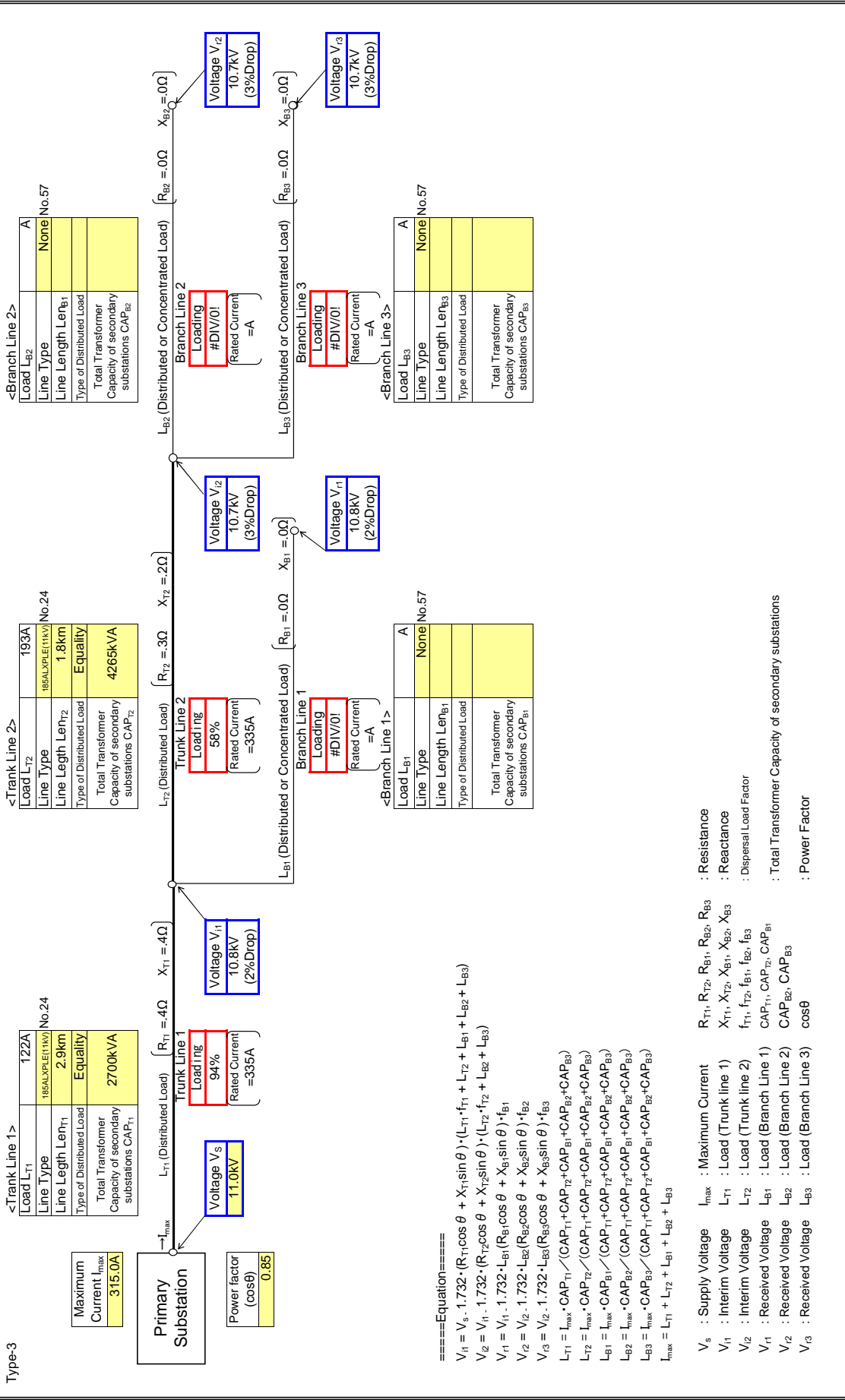
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

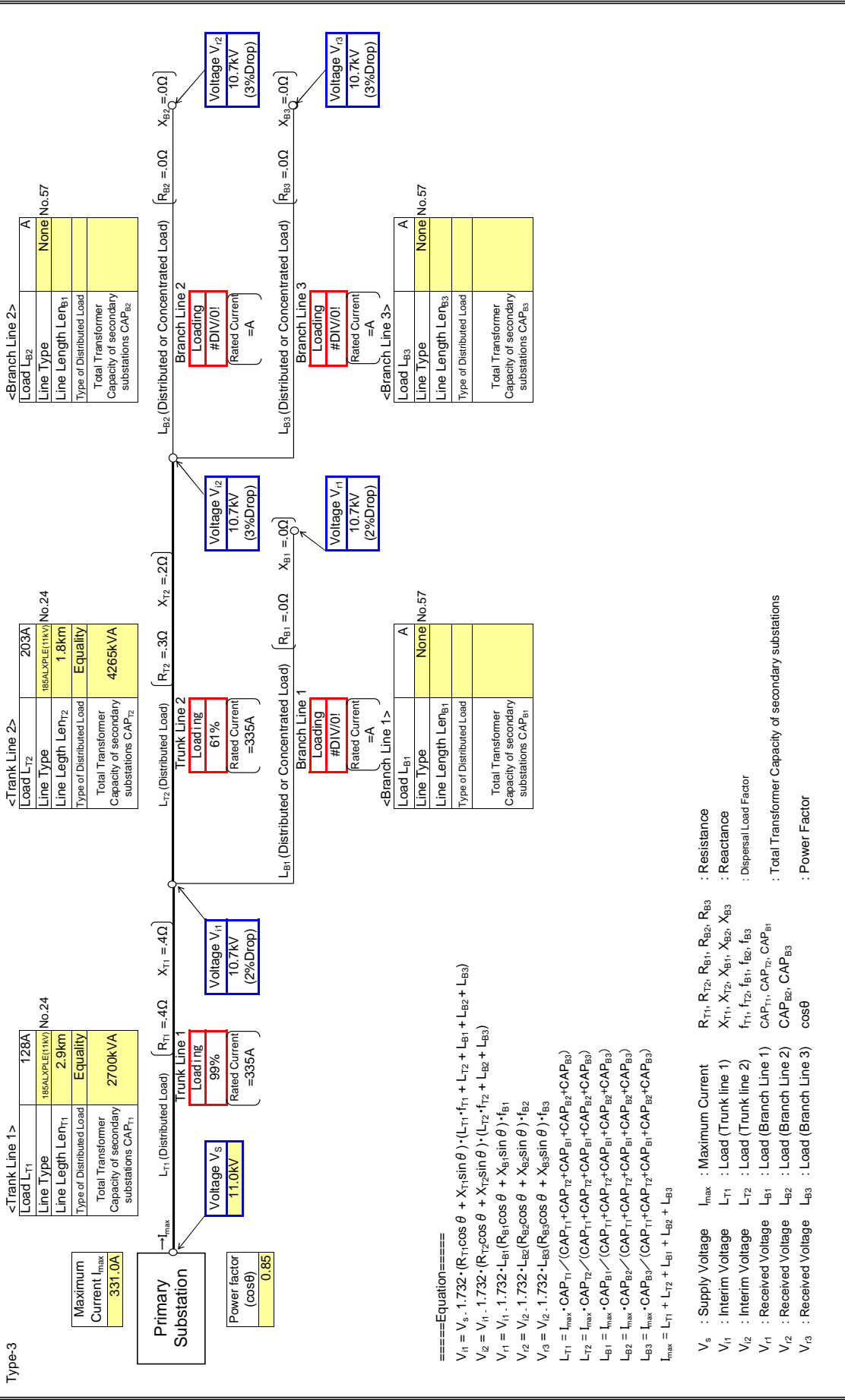
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

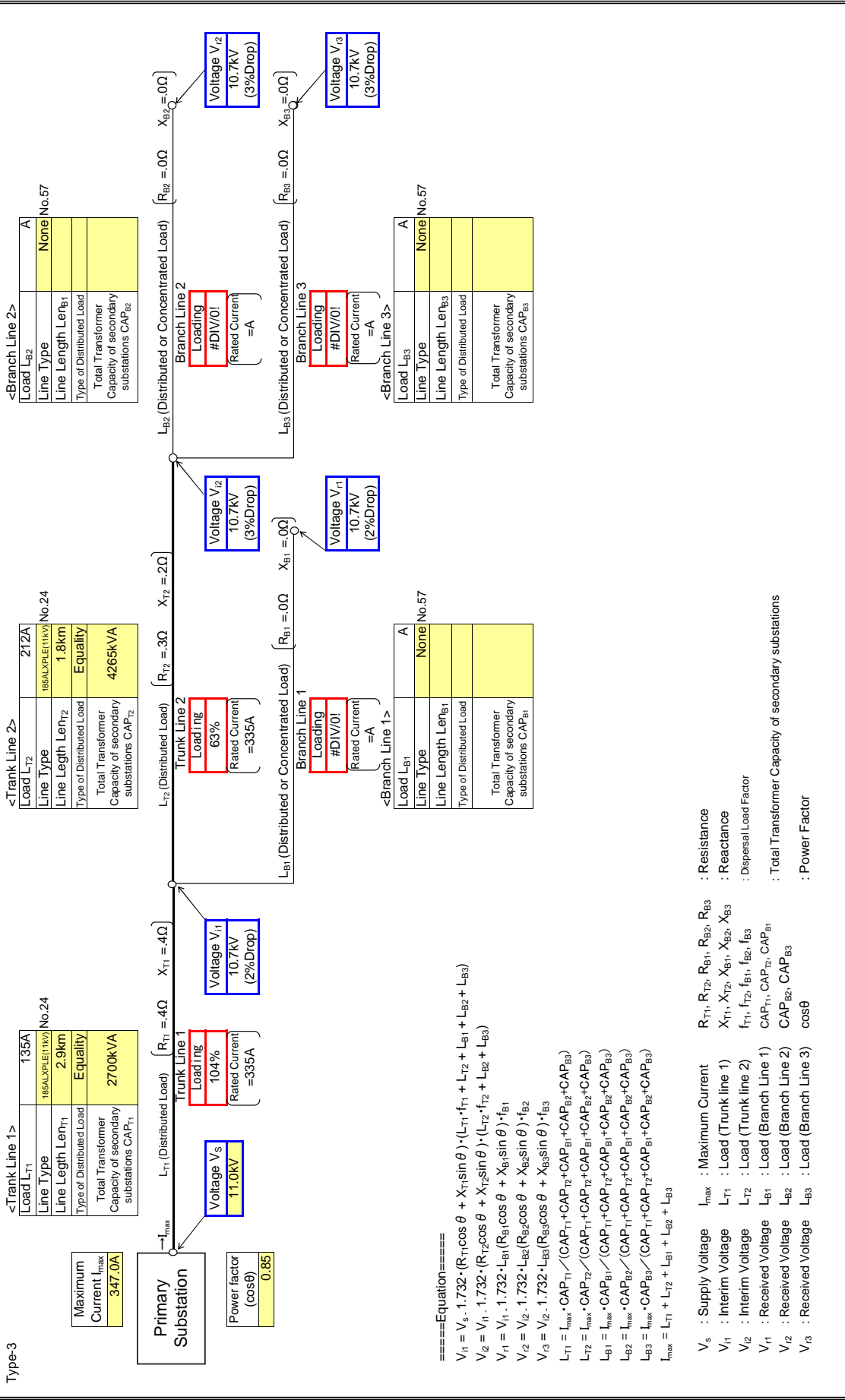
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

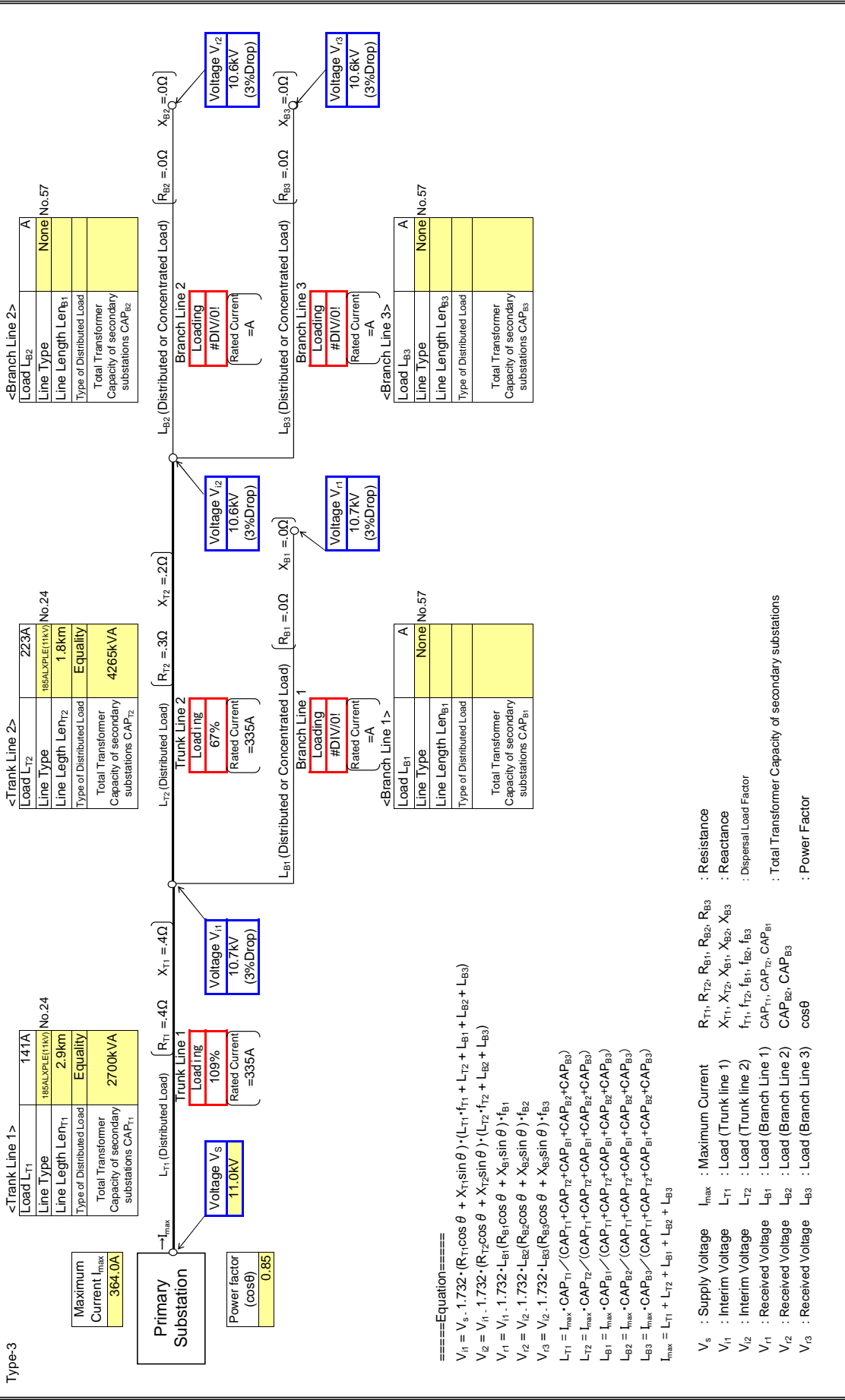
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E20

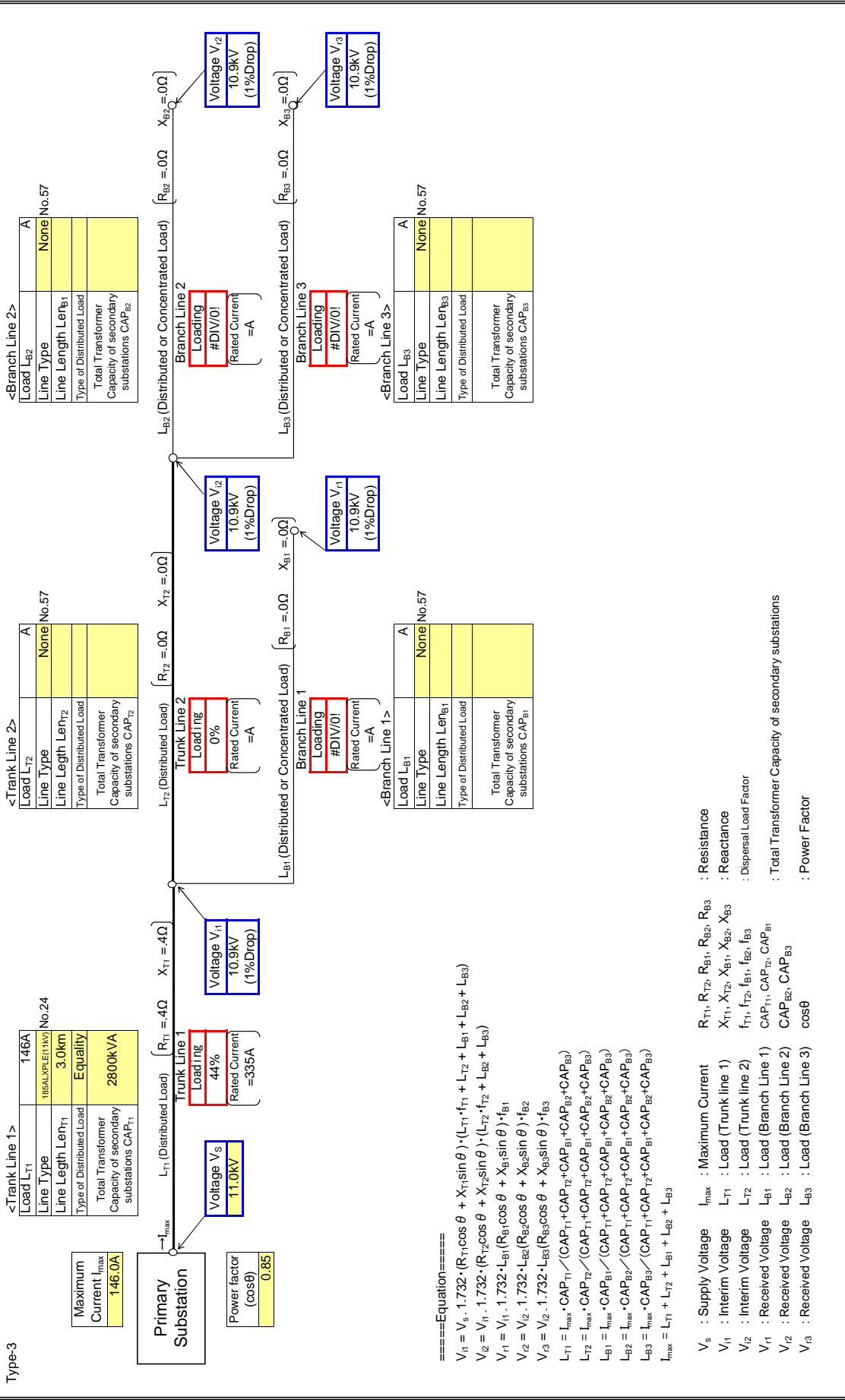
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

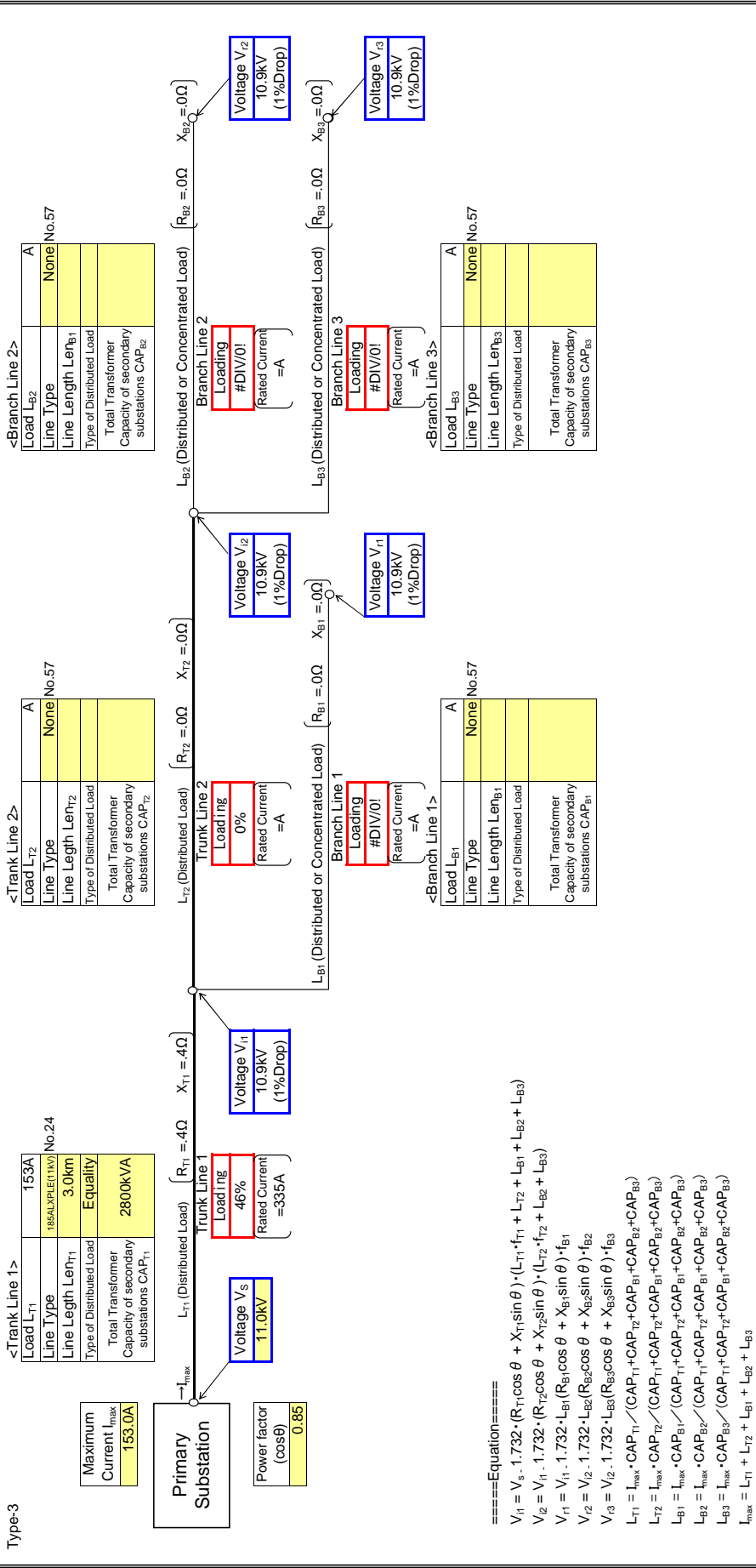
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

Input data in colored cells



====Equation====

$$V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{L1} = V_{T1} \cdot 1.732 \cdot (R_{L1} \cos \theta + X_{L1} \sin \theta) \cdot (L_{L1} \cdot f_{L1} + L_{L2} + L_{L3})$$

$$V_{B1} = V_{L1} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{B2} = V_{L2} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

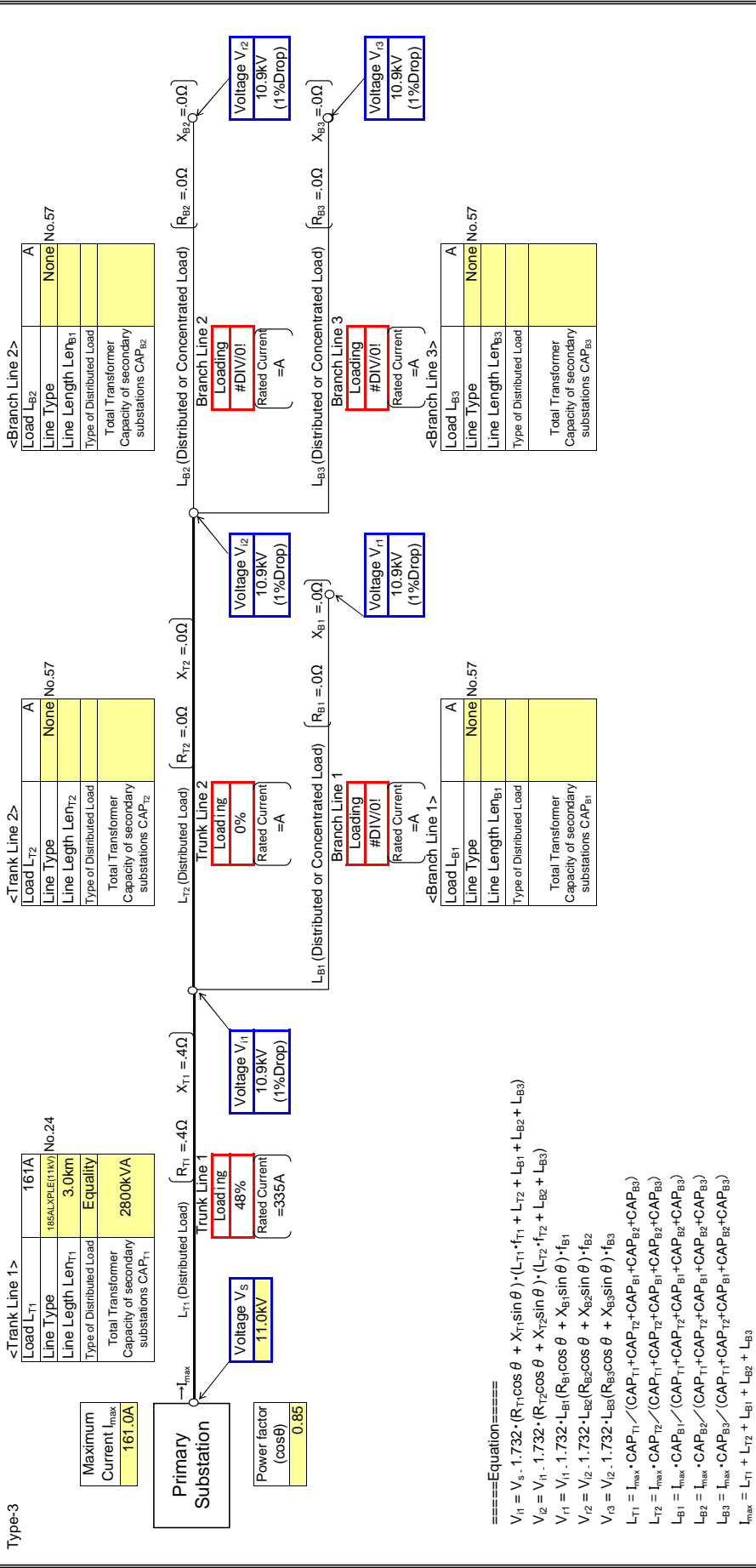
$$V_{B3} = V_{L3} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

- V_s : Supply Voltage
- V_{T1} : Interim Voltage
- V_{L1} : Interim Voltage
- V_{B1} : Received Voltage
- V_{B2} : Received Voltage
- V_{B3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

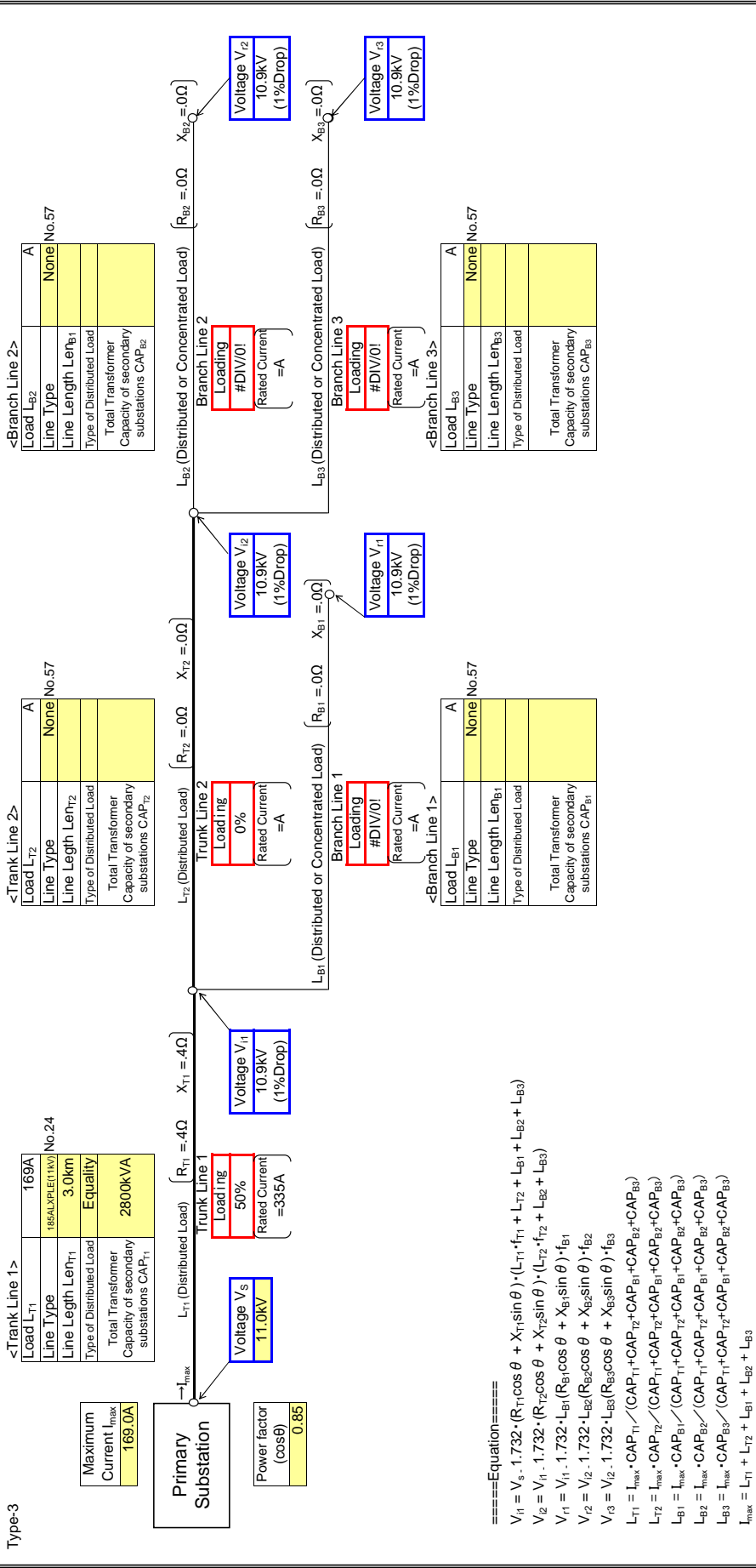
Legend:

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

Input data in colored cells



====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

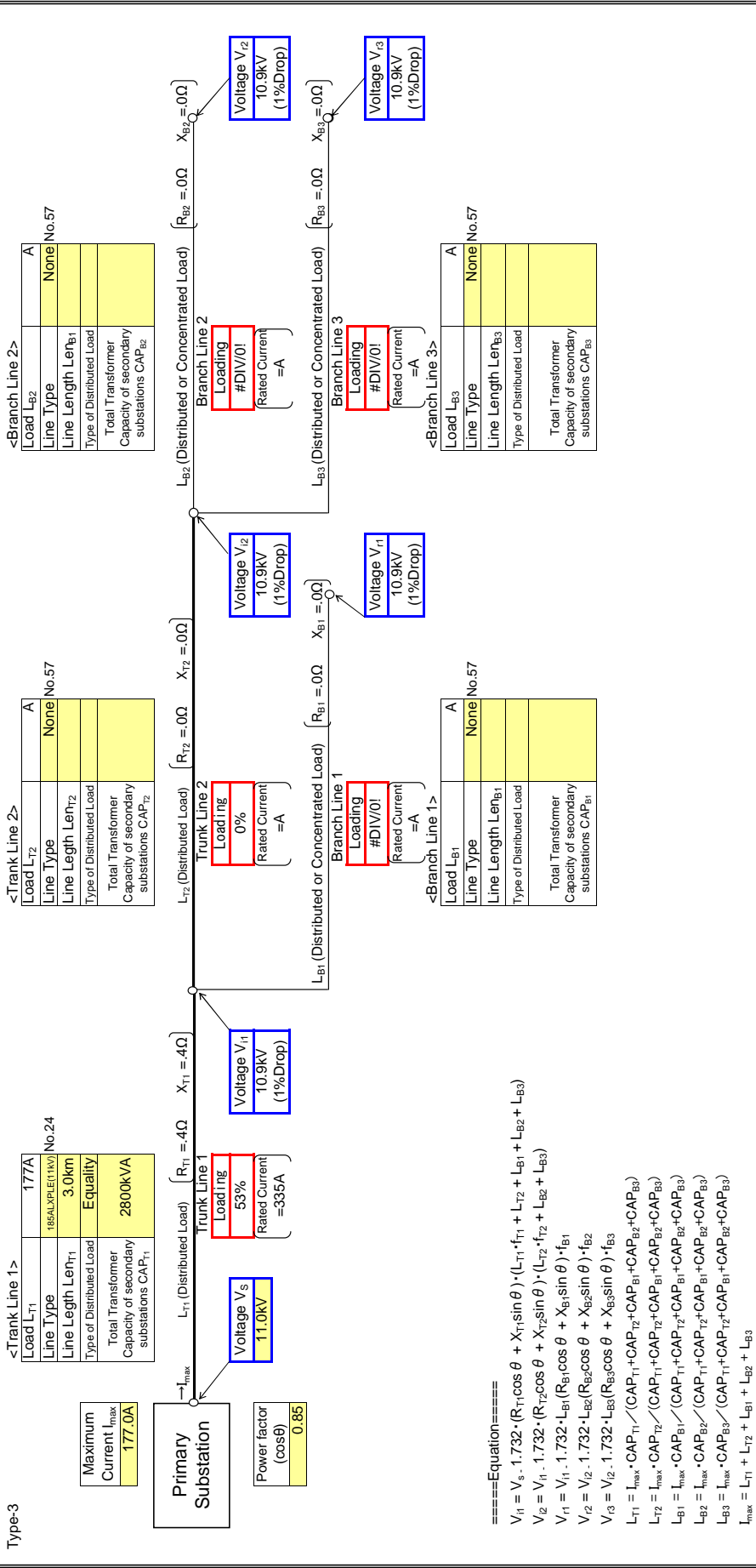
$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- CAP_{B2}, CAP_{B3} : Power Factor
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

Input data in colored cells

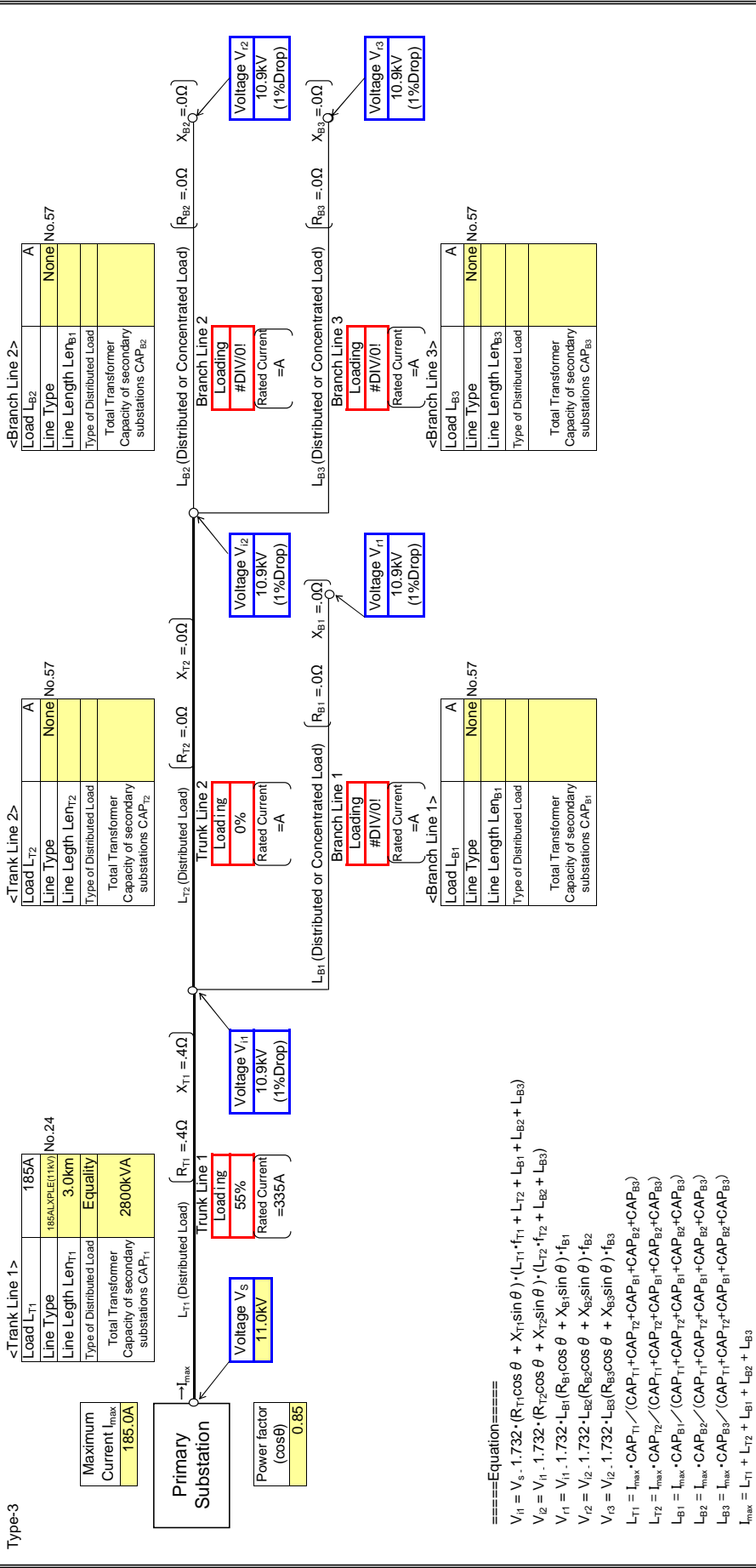


- ====Equation====
- $$V_{11} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$
- $$V_{12} = V_{11} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$
- $$V_{13} = V_{12} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$
- $$V_{22} = V_{12} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$
- $$V_{33} = V_{22} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$
- $$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{11} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{12} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{13} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{22} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{33} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

Input data in colored cells

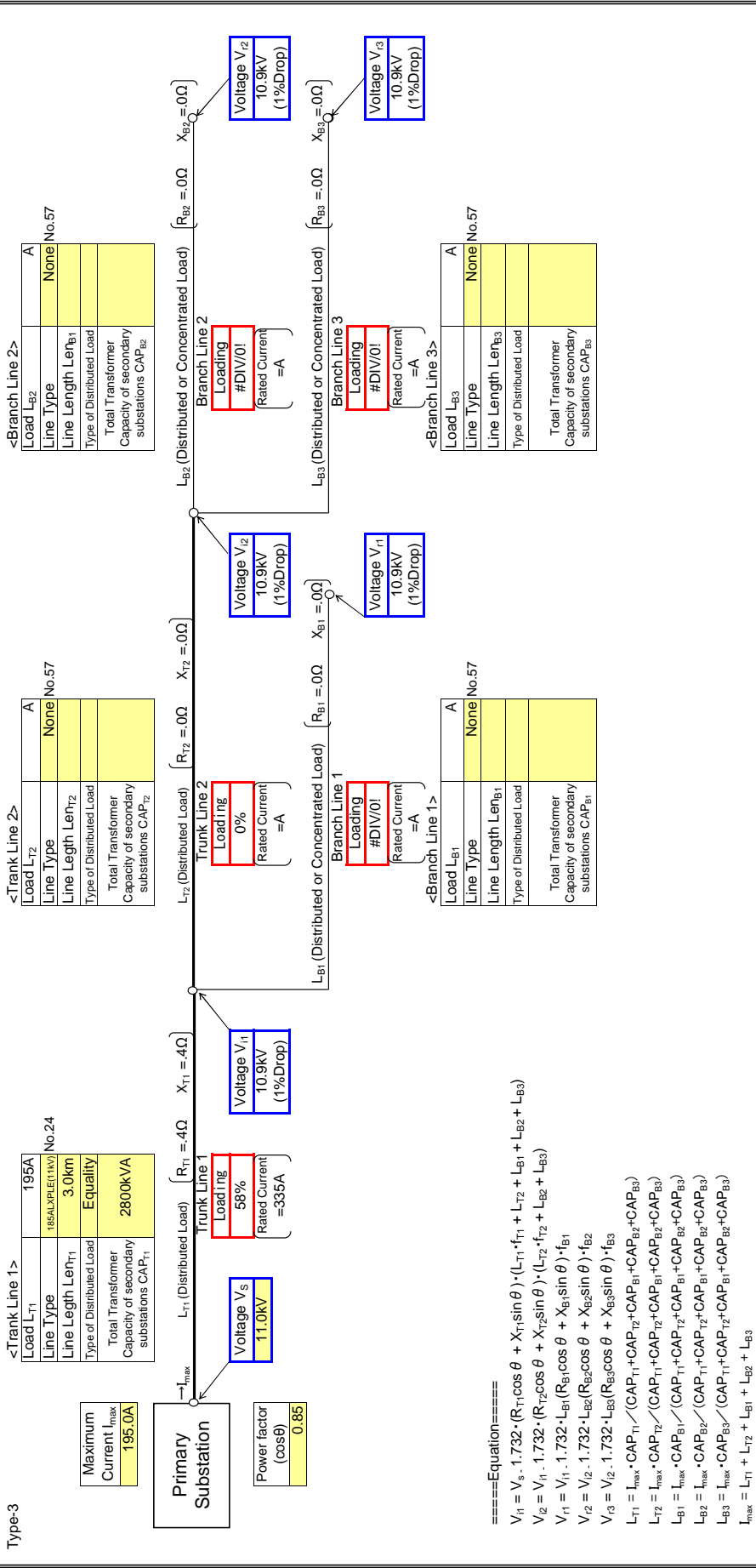


- ====Equation====
- $$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$
- $$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$
- $$V_{i3} = V_{i2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$
- $$V_{i4} = V_{i3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$
- $$V_{i5} = V_{i4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$
- $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{i1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{i2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{i3} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{i4} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{i5} : Received Voltage L_{B3} : Load (Branch Line 3)

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

Input data in colored cells



====Equation====

$$V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{B1} = V_{T1} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot (L_{B1} \cdot f_{B1} + L_{B2} + L_{B3})$$

$$V_{B2} = V_{T2} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{B3} = V_{T3} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

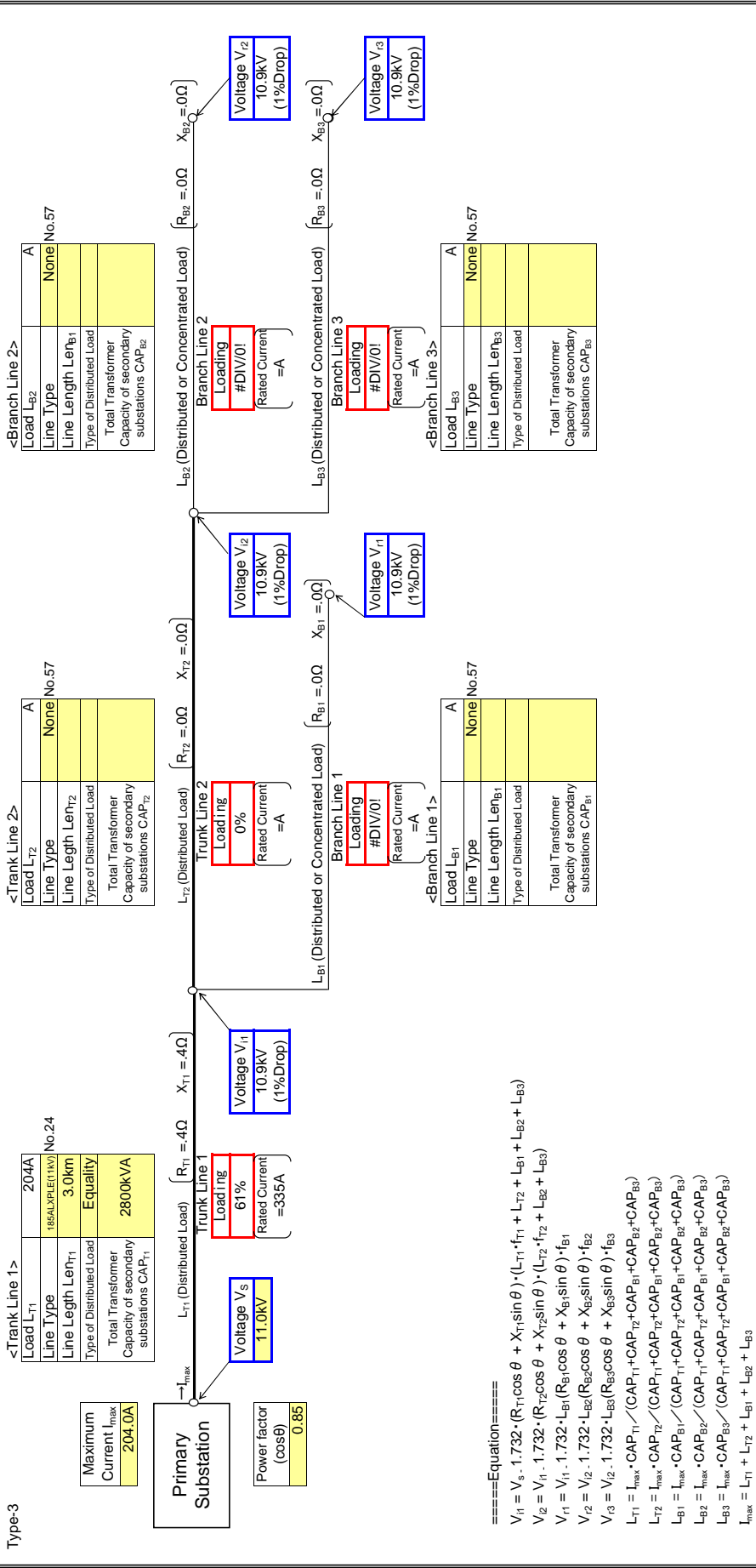
$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

Input data in colored cells



- V_s : Supply Voltage
- V_{i1} : Interim Voltage
- V_{i2} : Interim Voltage
- V_{r1} : Received Voltage
- V_{r2} : Received Voltage
- V_{r3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos\theta$: Power Factor

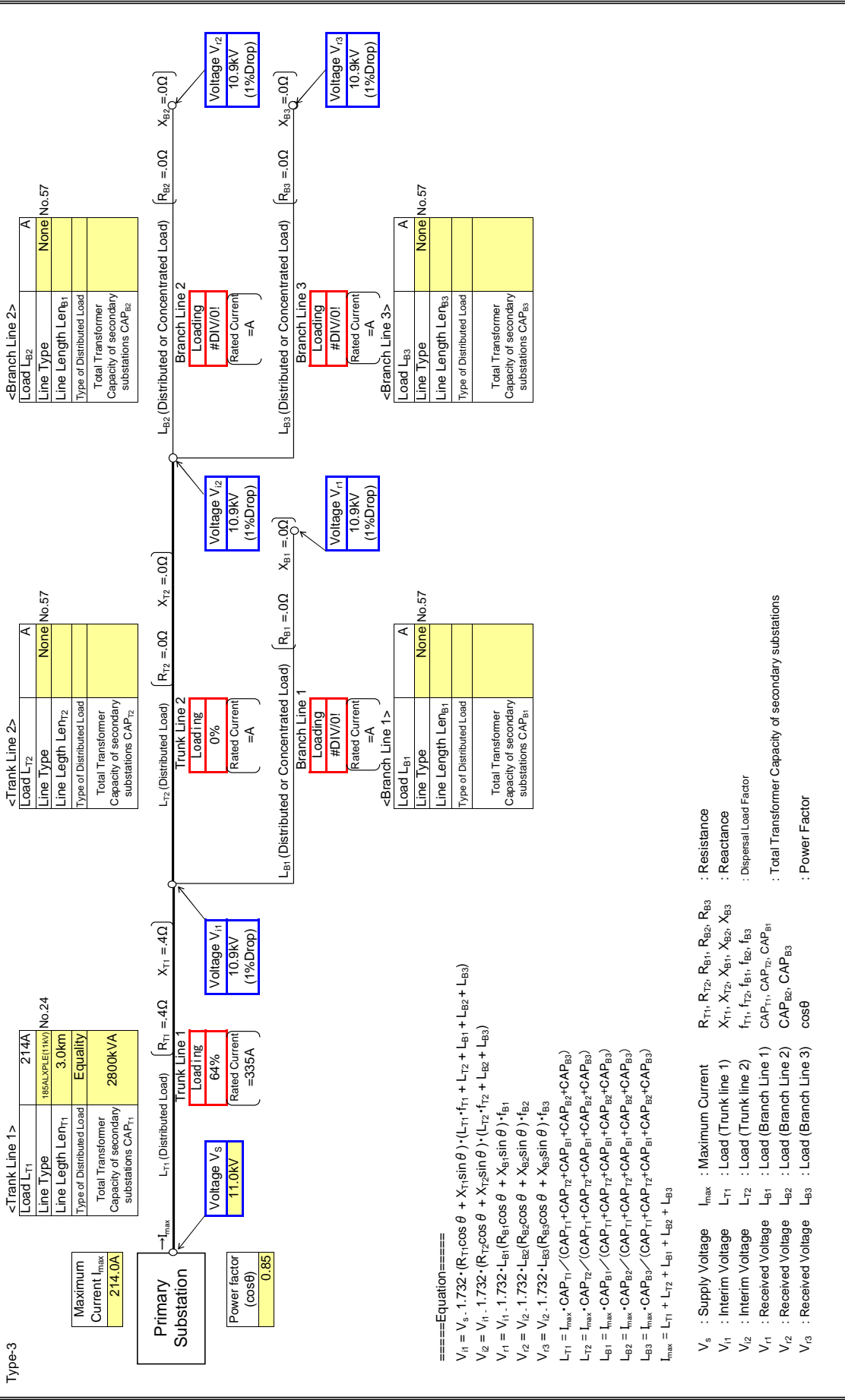
====Equation====
 $V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

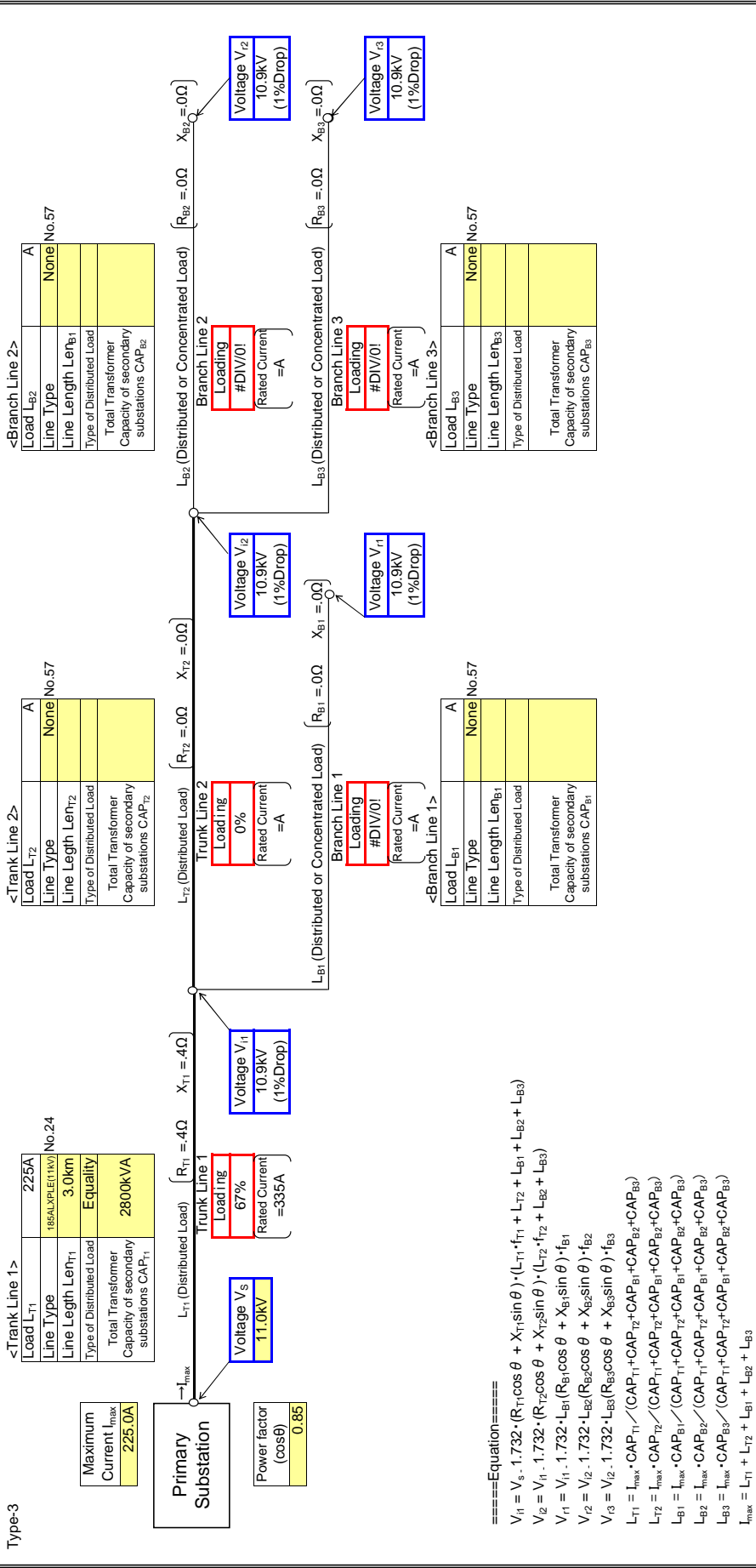
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

Input data in colored cells

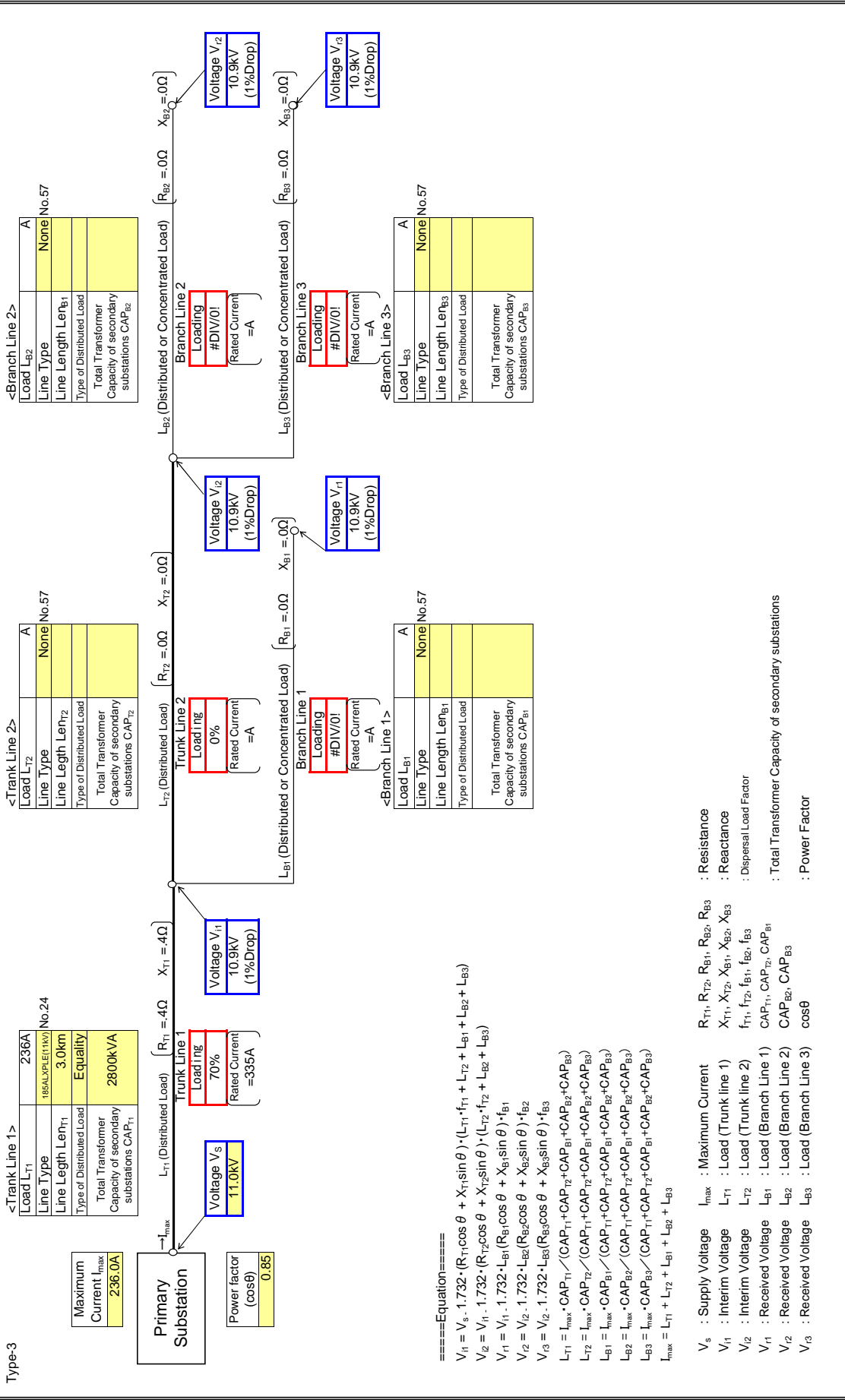


- V_s : Supply Voltage
- V_{i1} : Interim Voltage
- V_{i2} : Interim Voltage
- V_{r1} : Received Voltage
- V_{r2} : Received Voltage
- V_{r3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos\theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

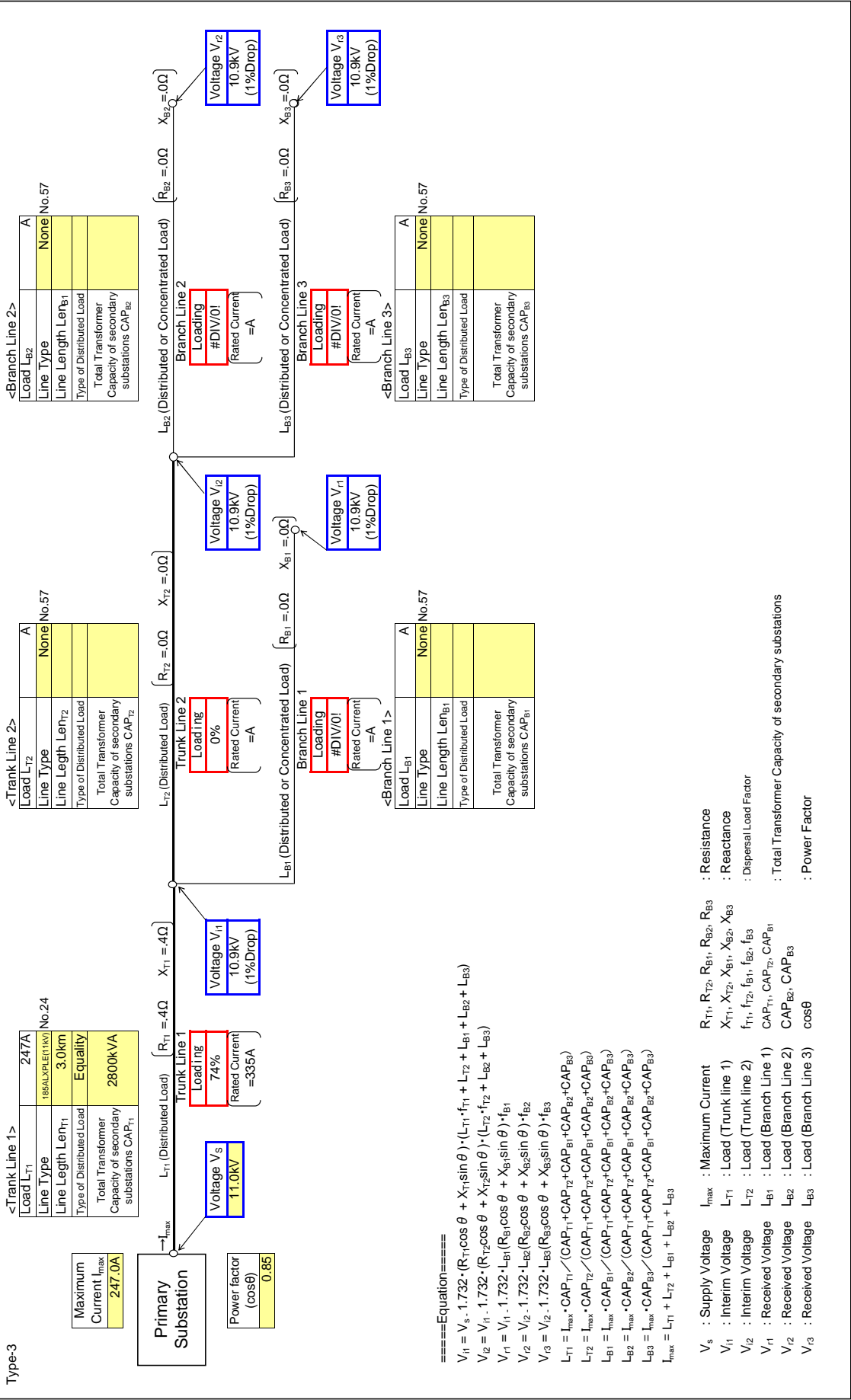
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	E26

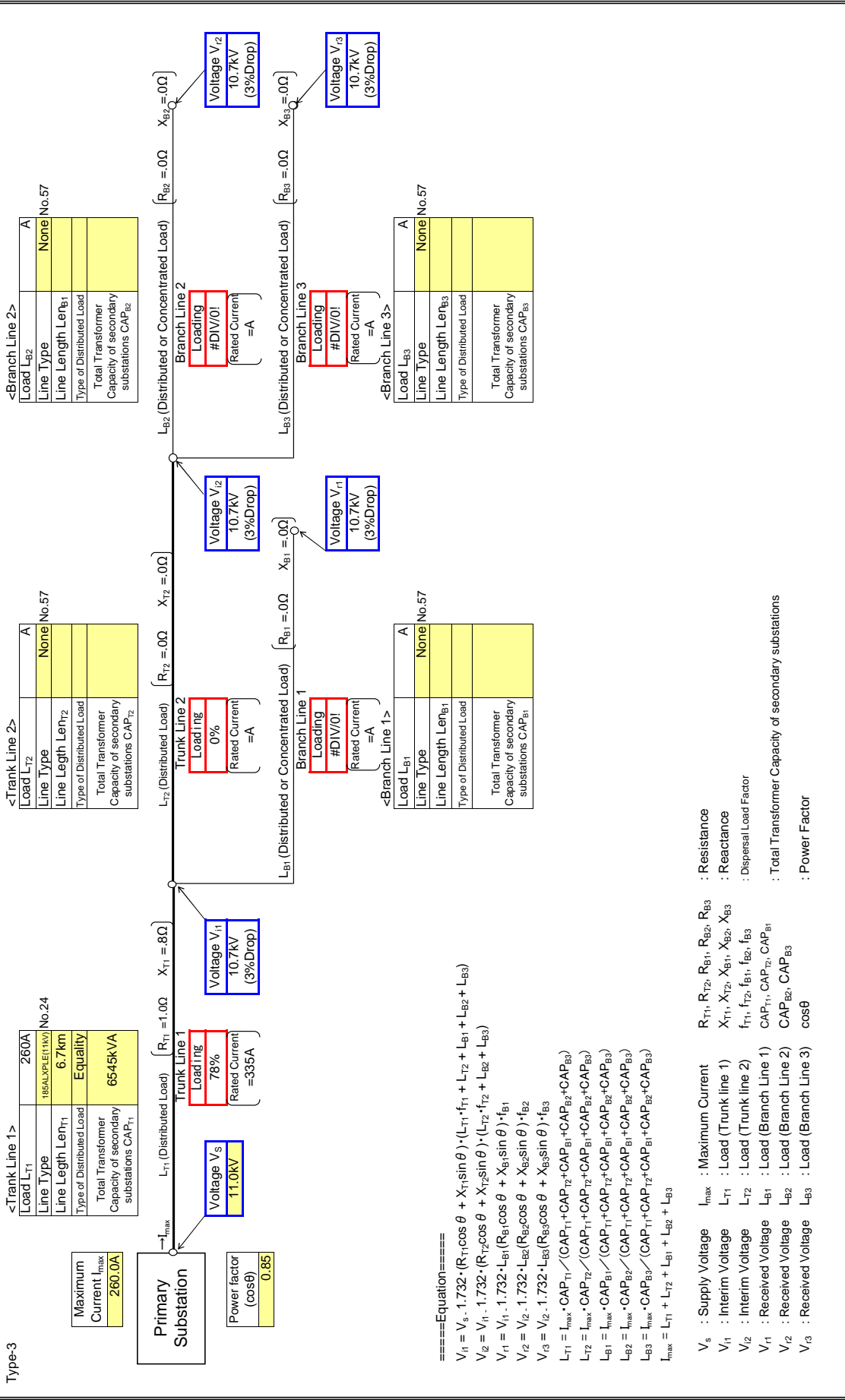
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

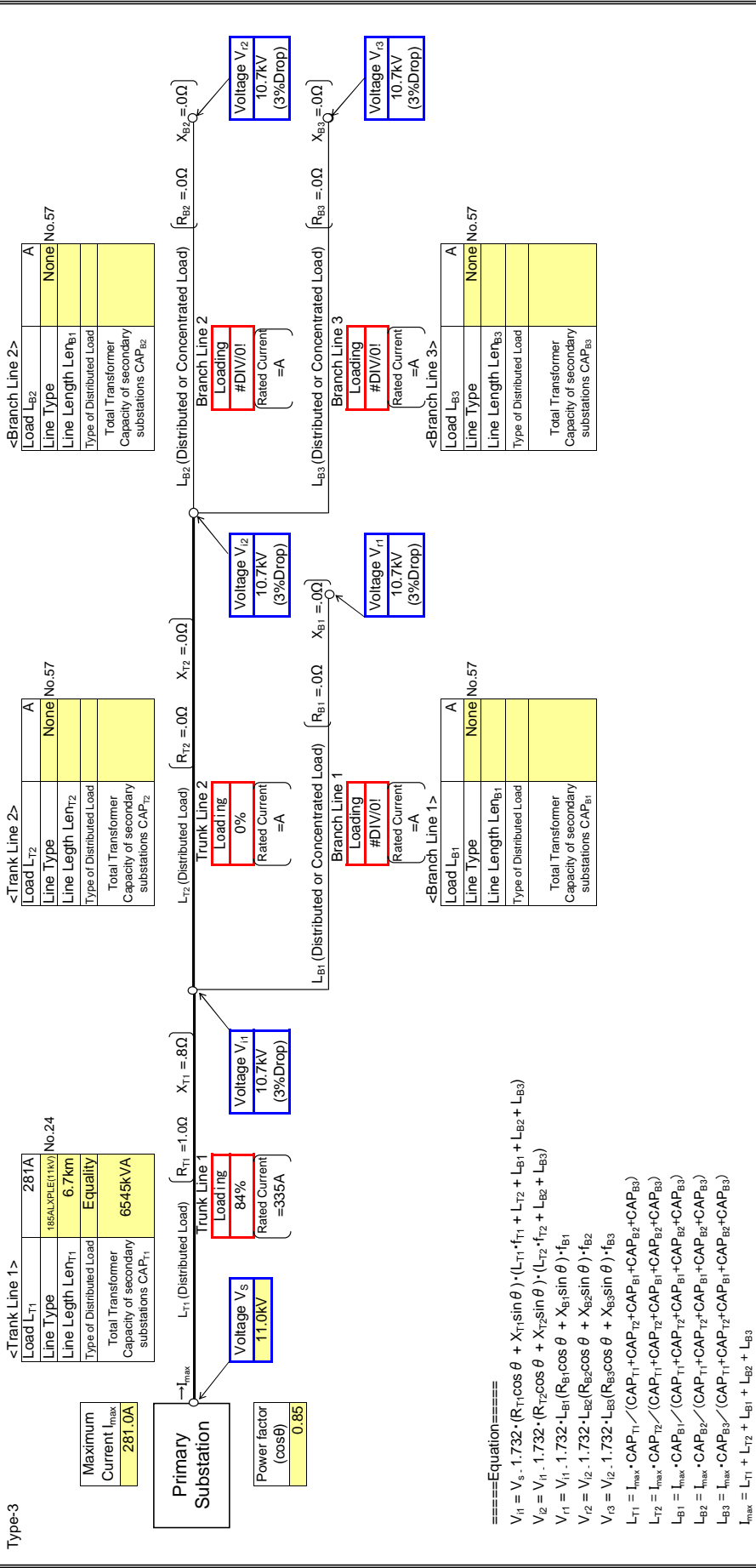
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

Type-3 : Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

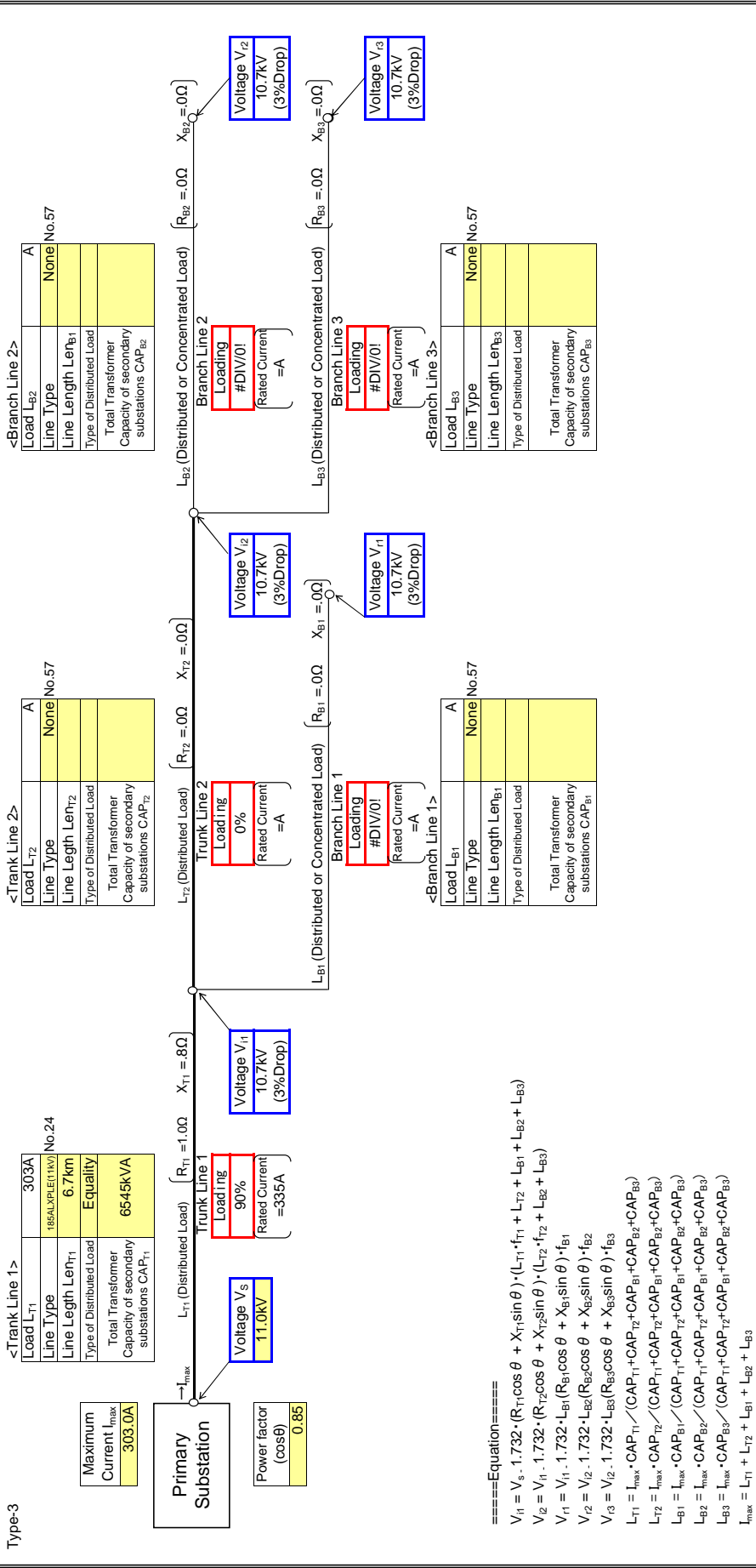
$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

Input data in colored cells

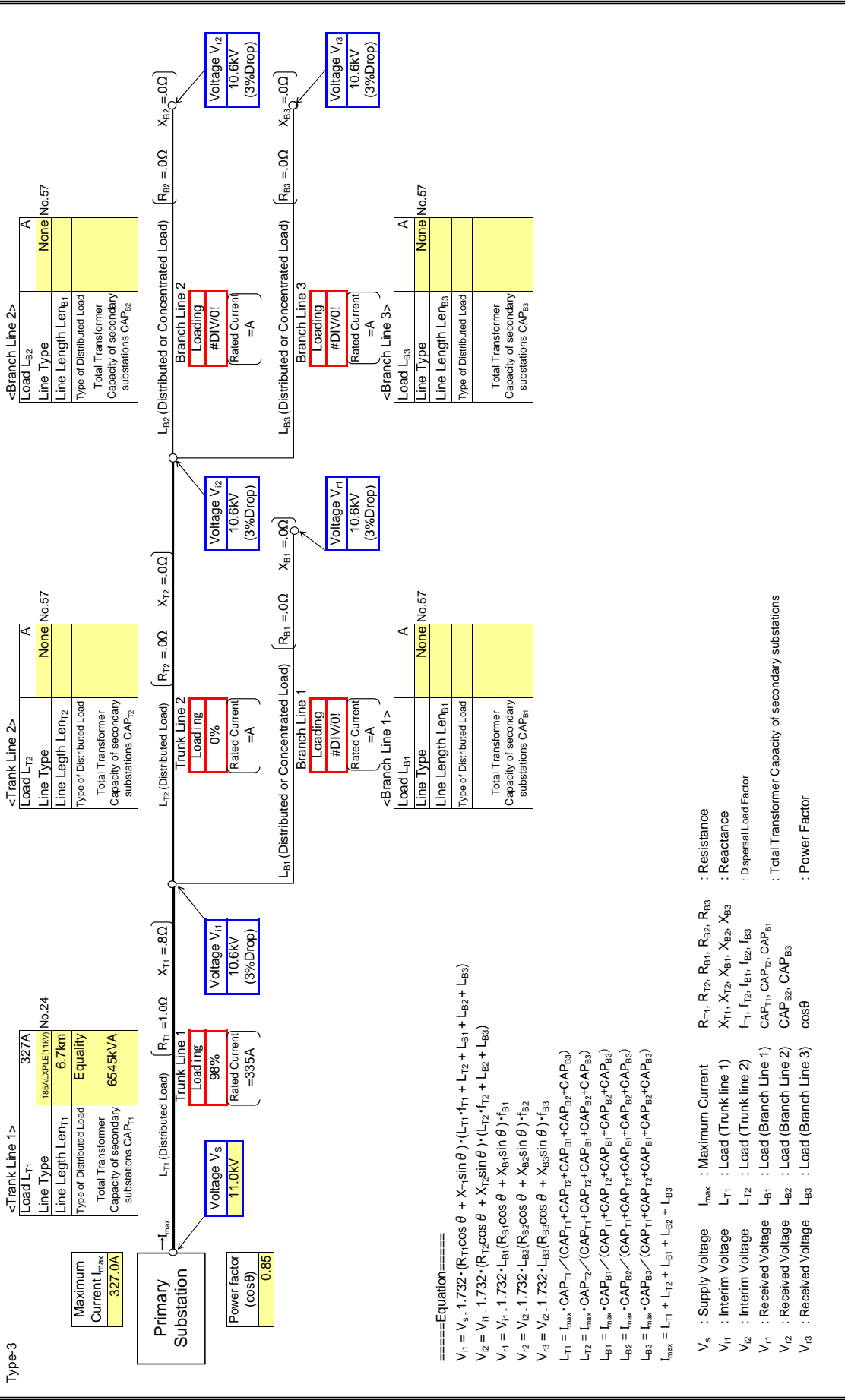


- V_s : Supply Voltage
- V_{i1} : Interim Voltage
- V_{i2} : Interim Voltage
- V_{r1} : Received Voltage
- V_{r2} : Received Voltage
- V_{r3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos\theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

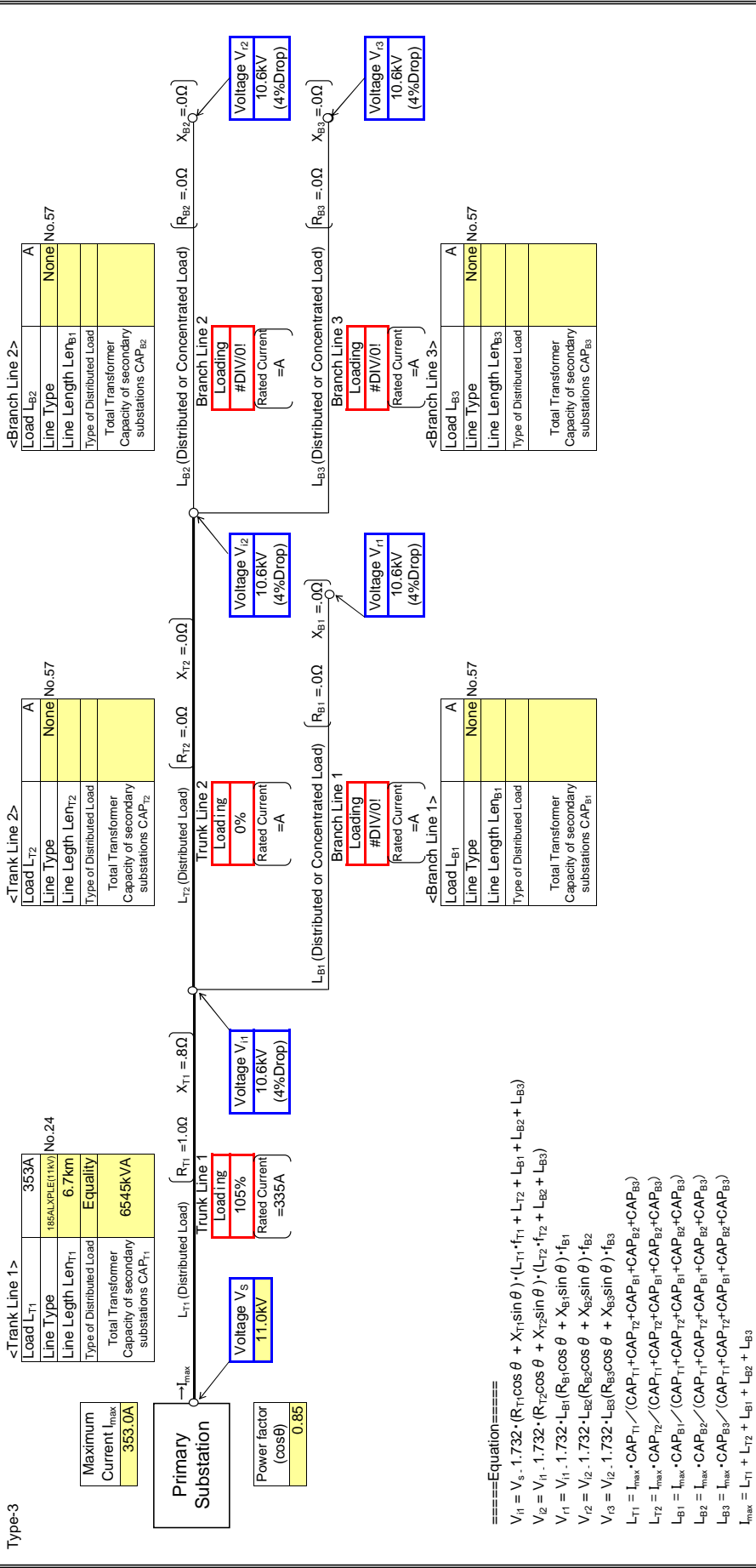
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

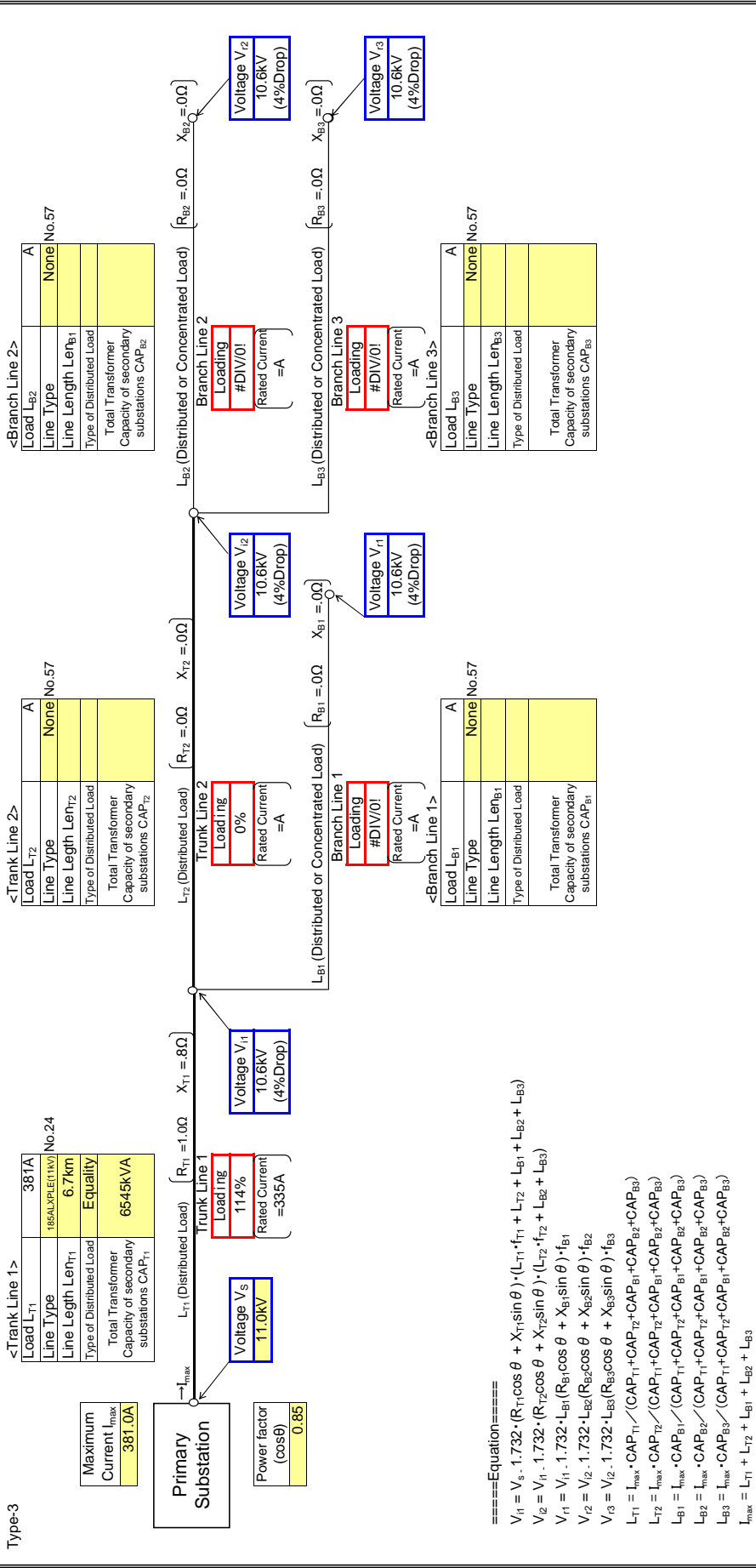
Legend:

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- L_{T1}, L_{T2} : Load (Trunk line 1), Load (Trunk line 2)
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1}, V_{r2}, V_{r3} : Received Voltage (Branch Line 1), (Branch Line 2), (Branch Line 3)
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

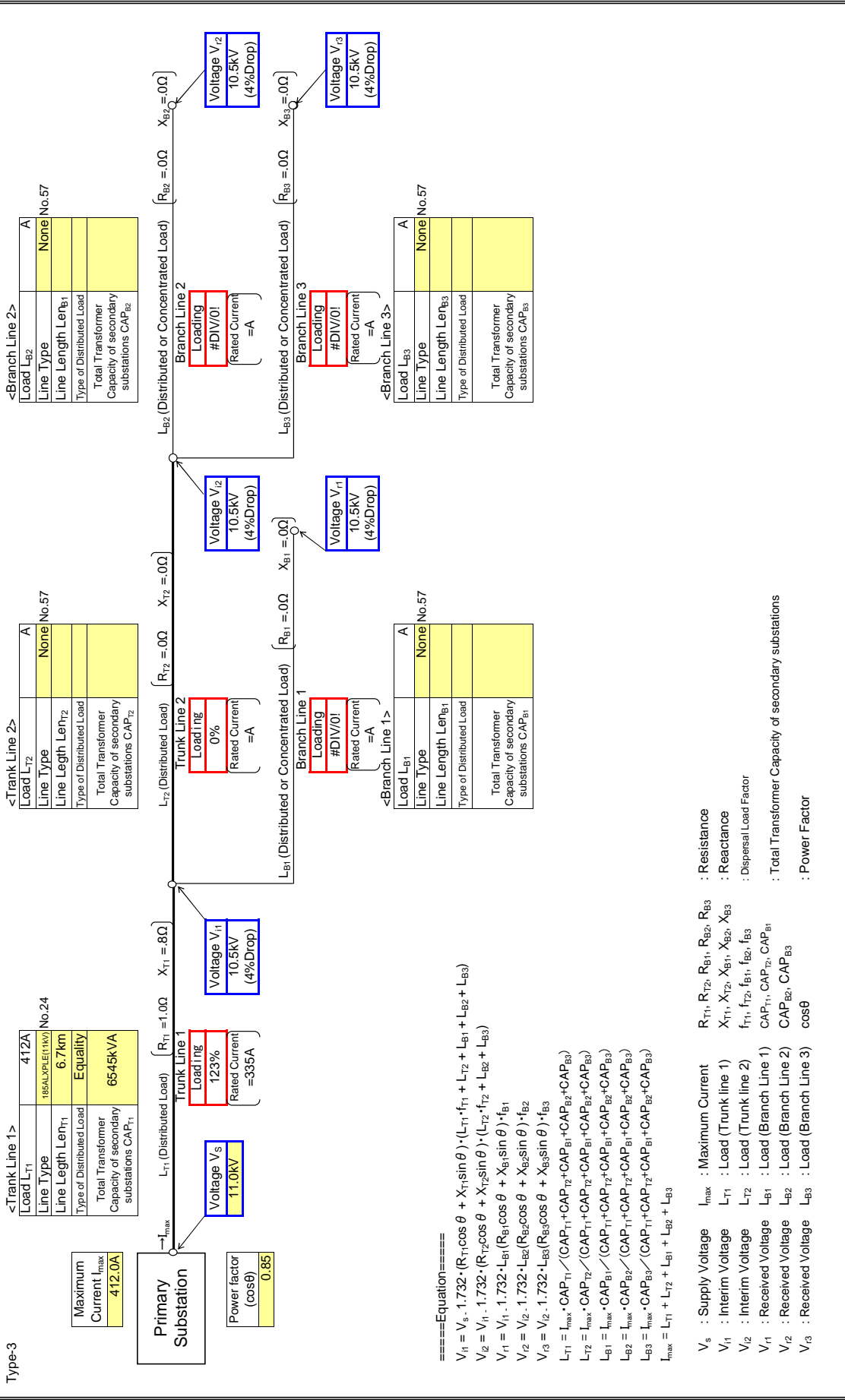
$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{r1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{r2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{r3} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{r4} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{r5} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

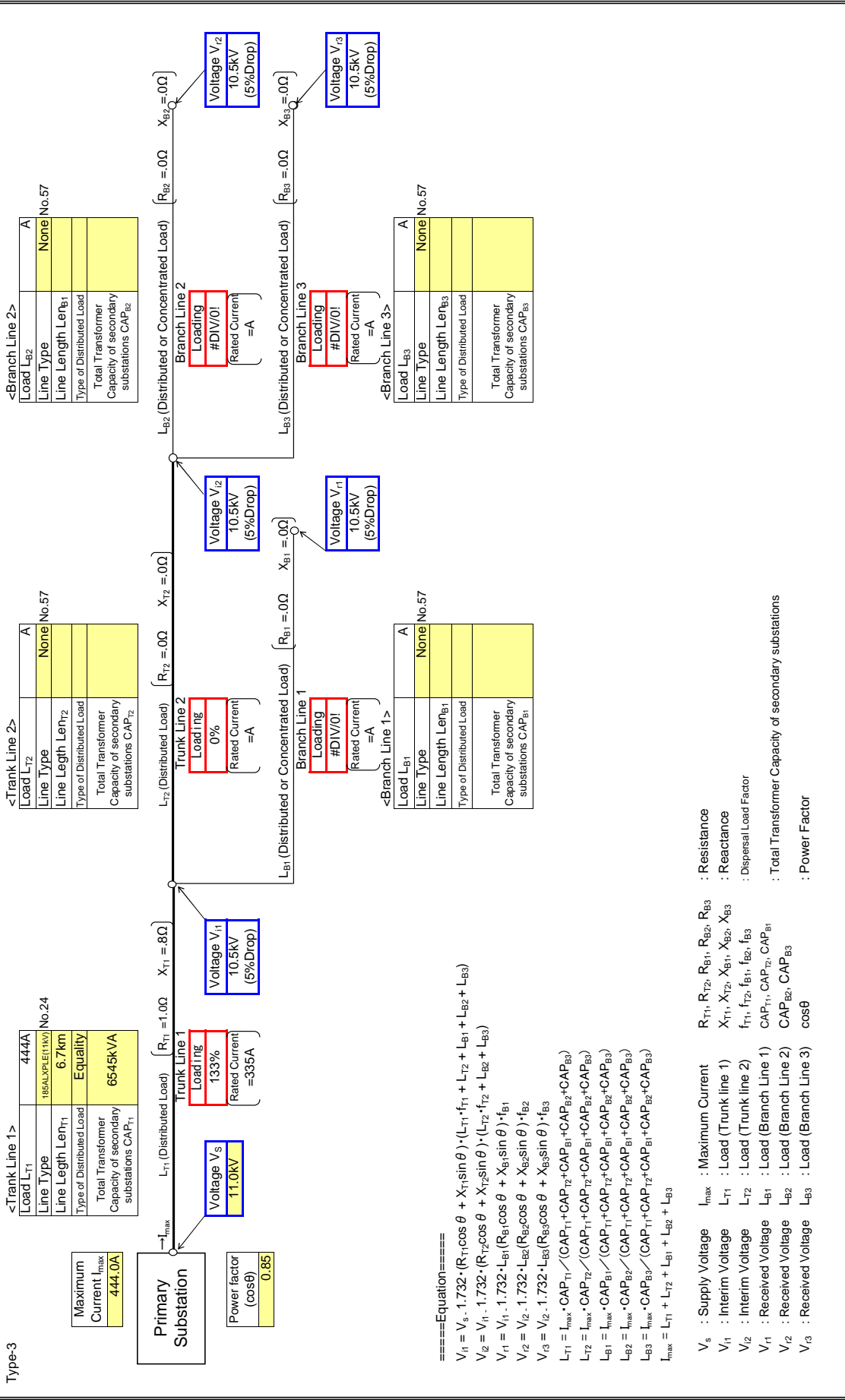
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

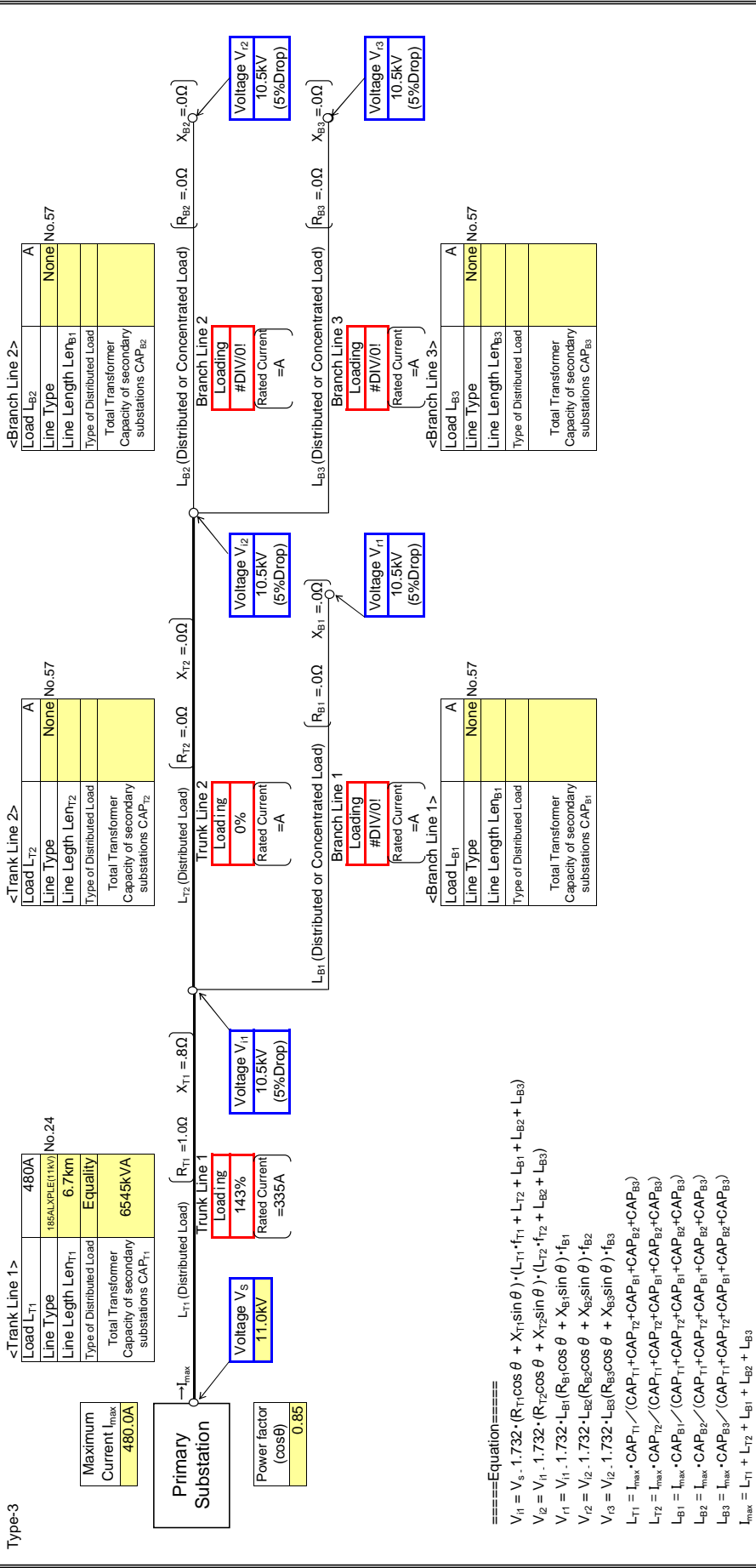
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

Input data in colored cells



====Equation====

$$V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{T2} = V_{T1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{B1} = V_{T1} \cdot 1.732 \cdot L_{B1} \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

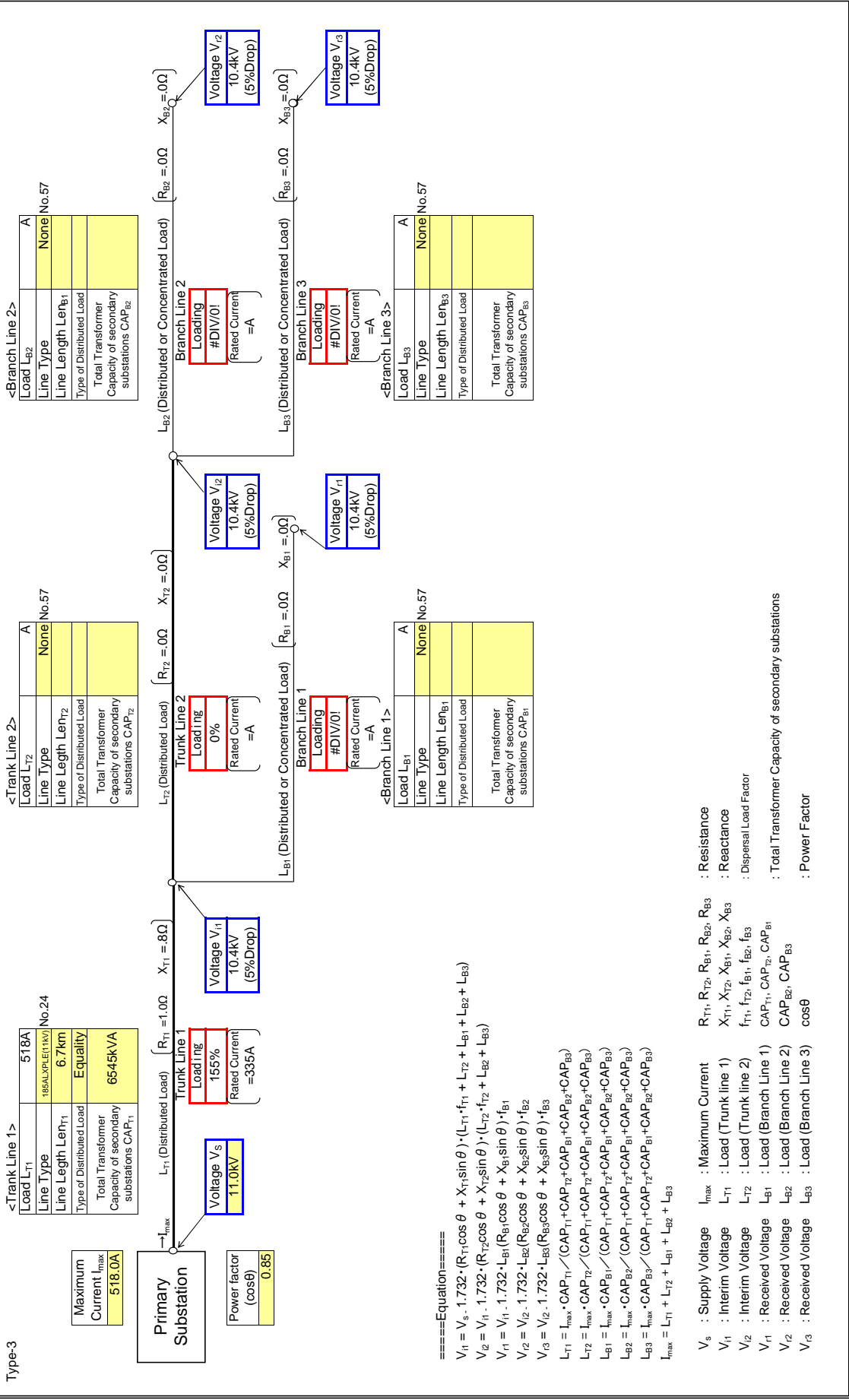
$$V_{B2} = V_{T2} \cdot 1.732 \cdot L_{B2} \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{B3} = V_{T3} \cdot 1.732 \cdot L_{B3} \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

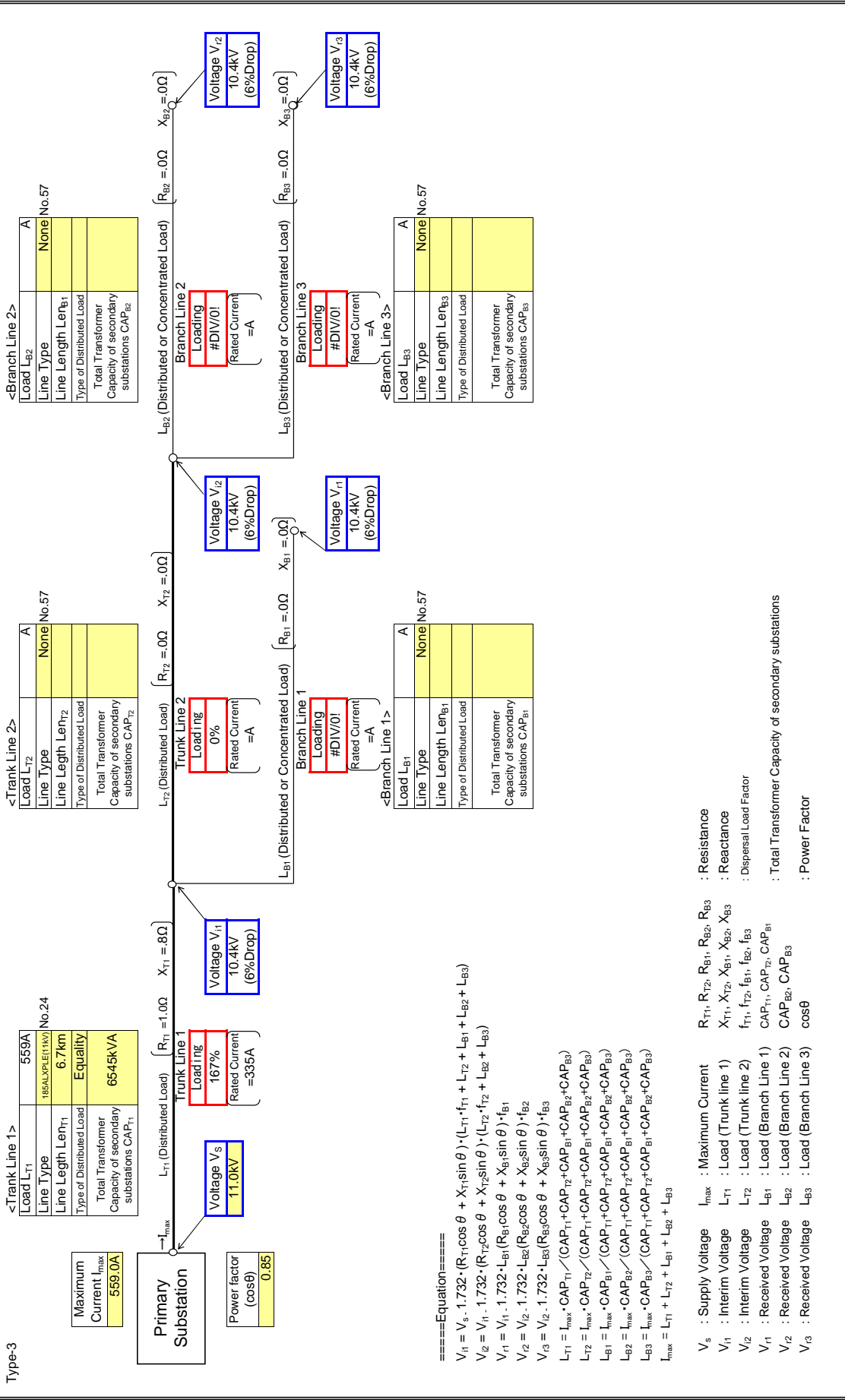
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

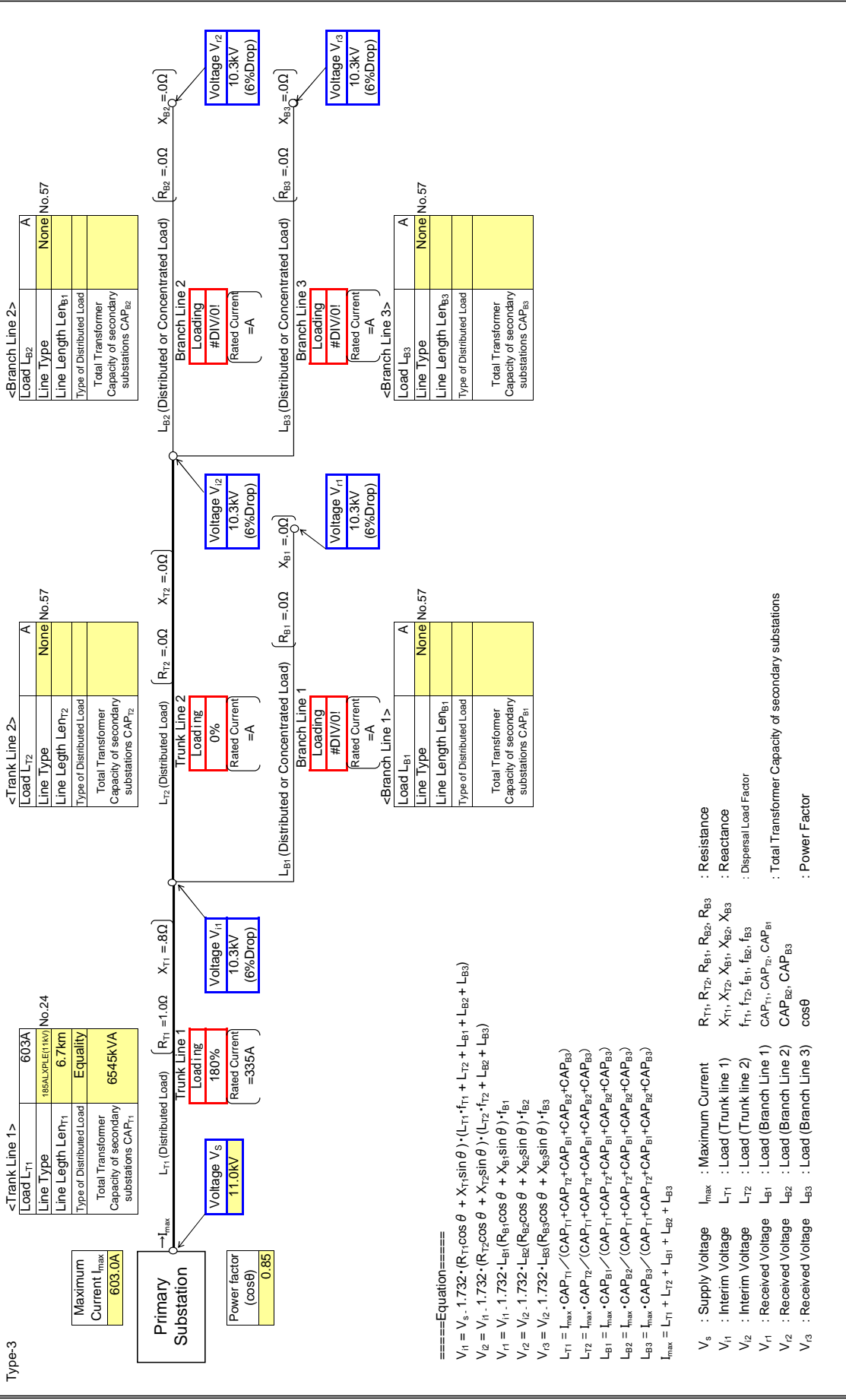
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION E
Feeder Name	EG-14

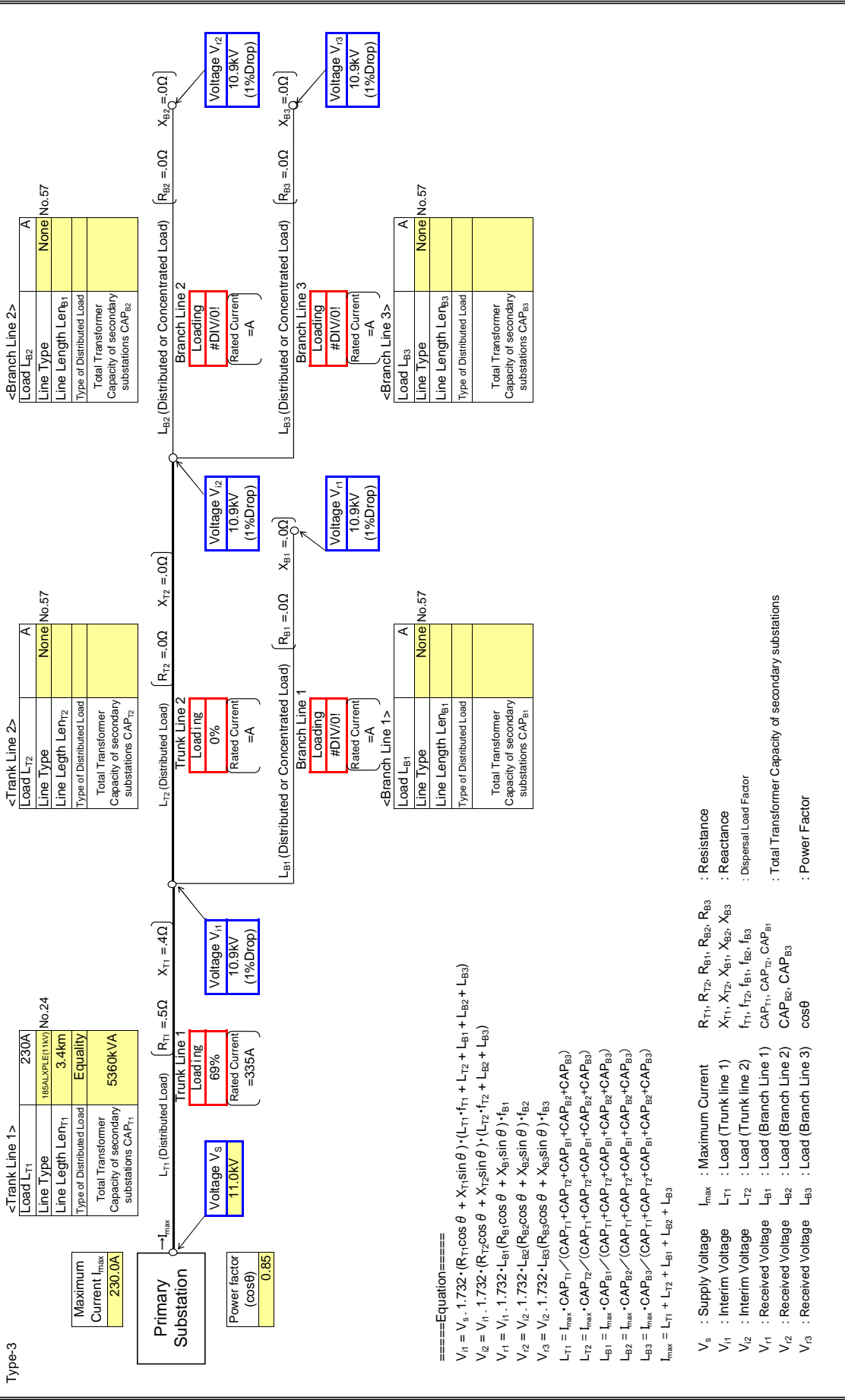
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

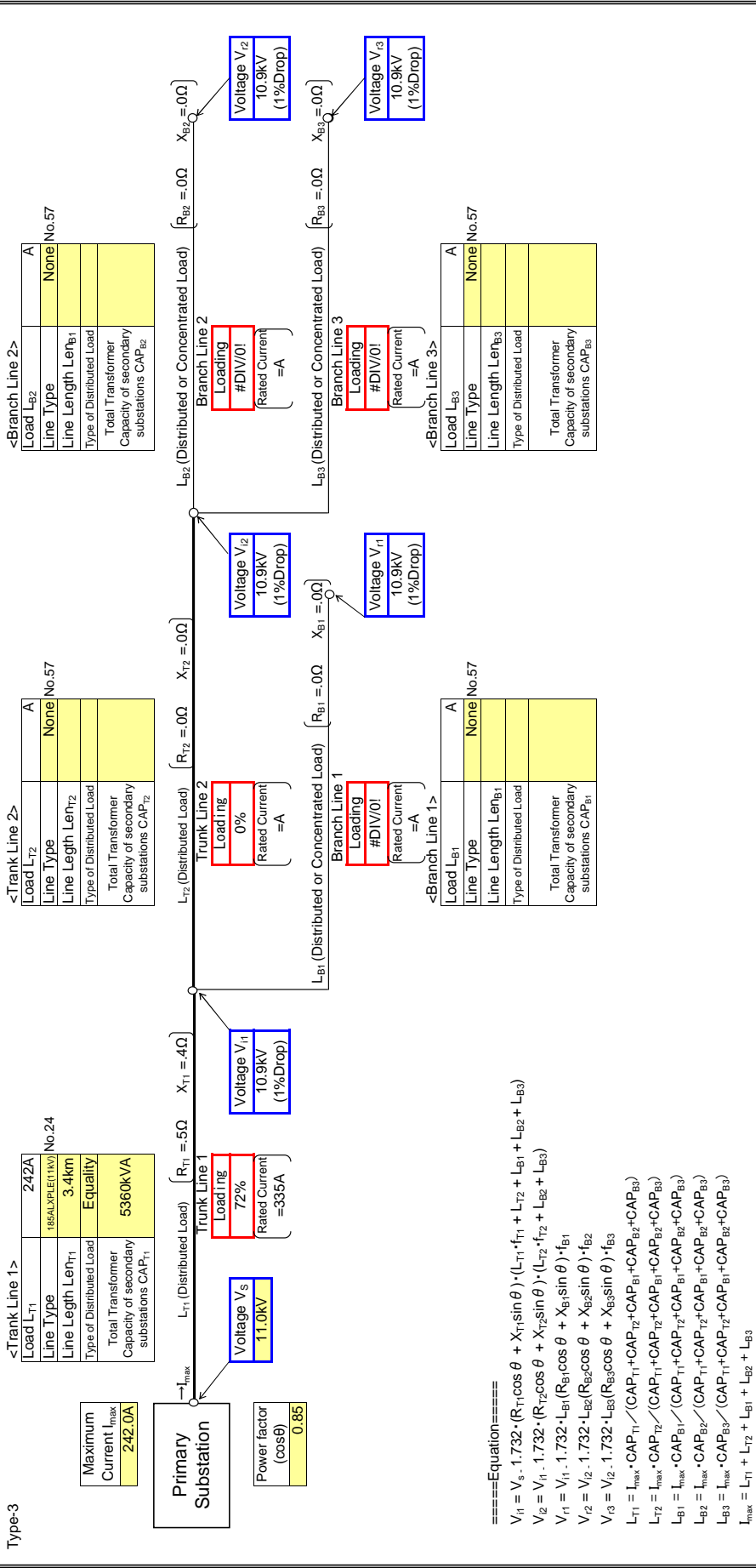
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

: Input data in colored cells

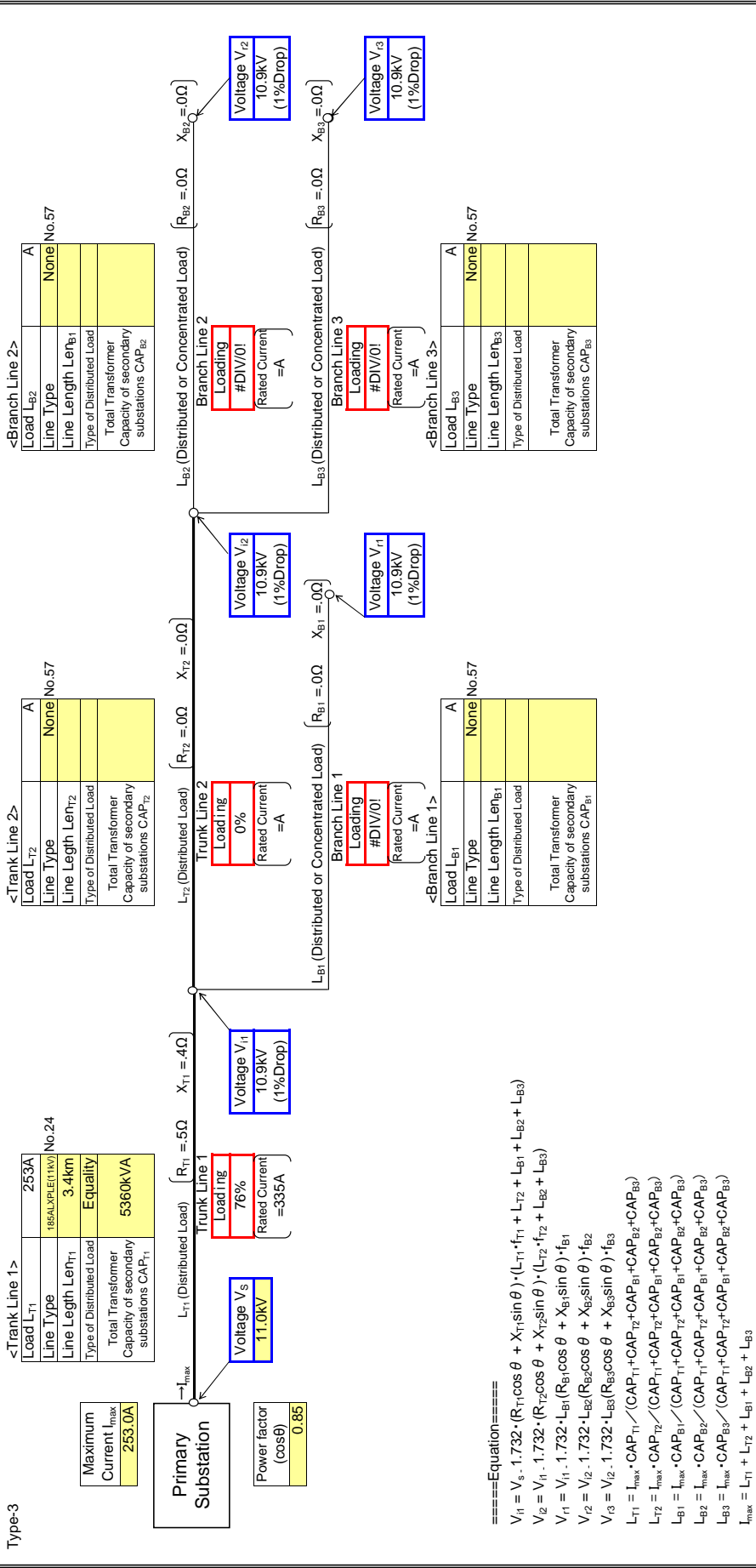


- ====Equation====
- $V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
- $V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
- $V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
- $V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
- $V_{r3} = V_{i3} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$
- $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- V_{i1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- V_{i2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
- V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

: Input data in colored cells

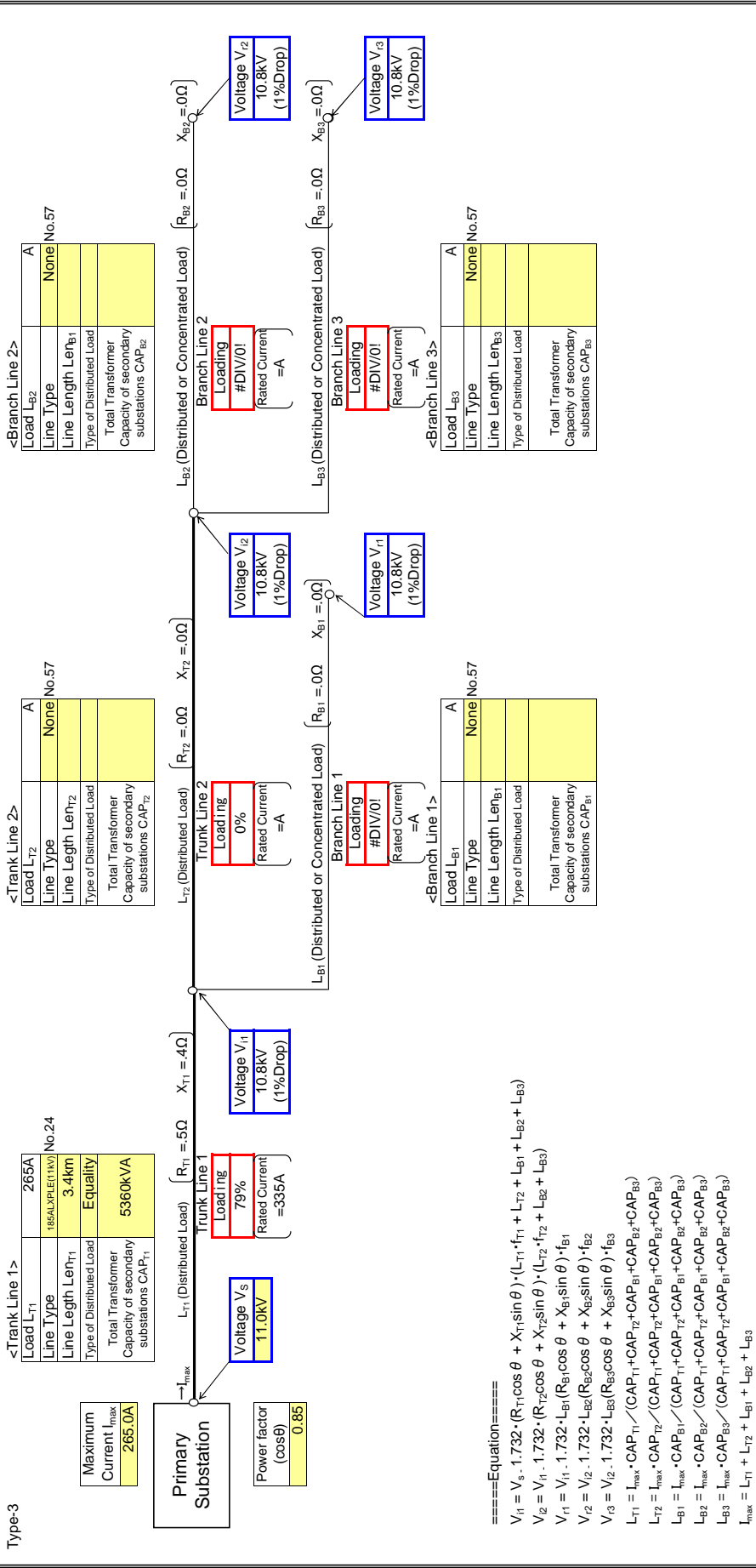


- ====Equation====
- $$V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$
- $$V_{T2} = V_{T1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$
- $$V_{B1} = V_{T1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$
- $$V_{B2} = V_{T2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$
- $$V_{B3} = V_{T2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$
- $$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{T1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{T2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{B1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{B2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{B3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

: Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

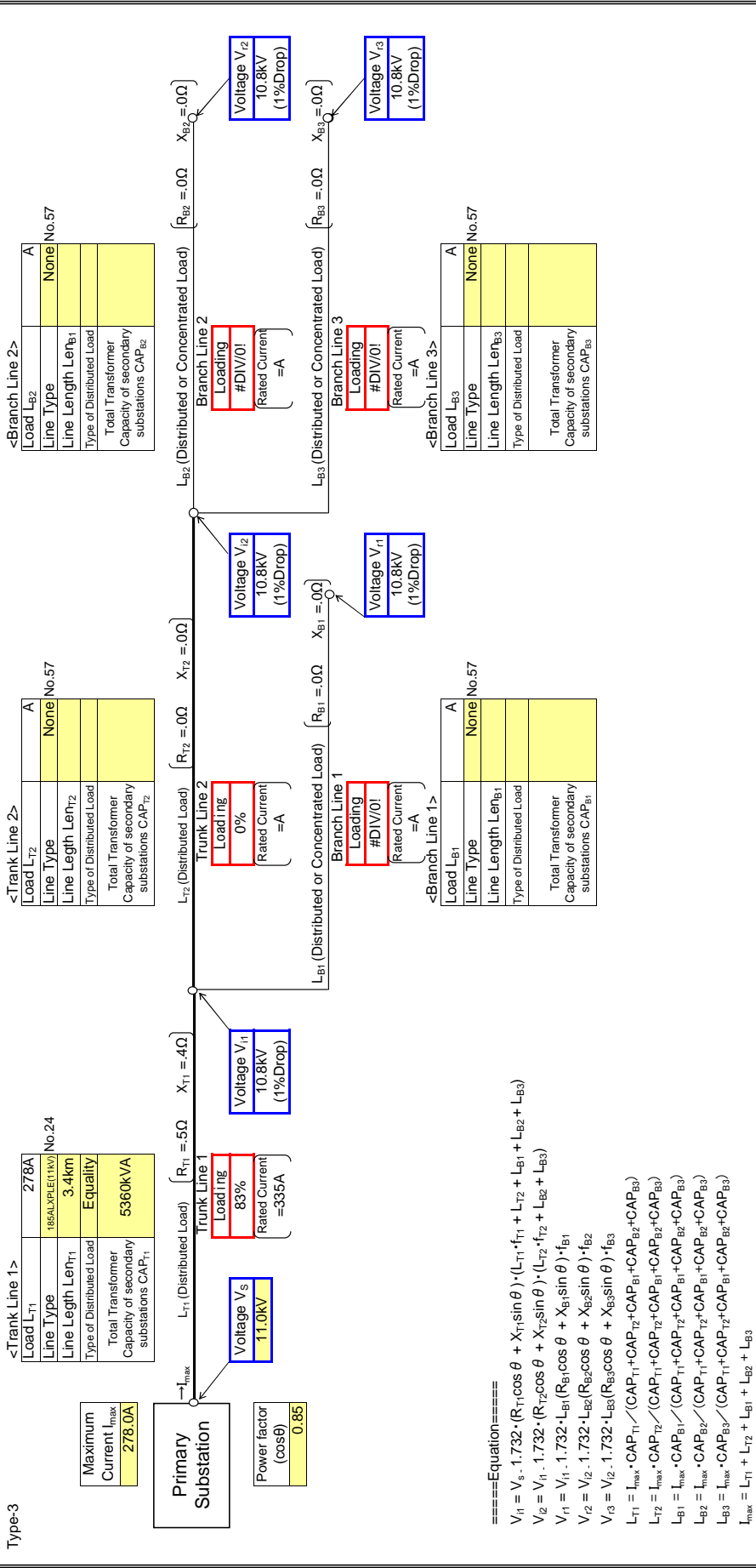
$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{r1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{r2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

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====Equation====

$$V_{11} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{12} = V_{11} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{13} = V_{11} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{14} = V_{12} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{15} = V_{12} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

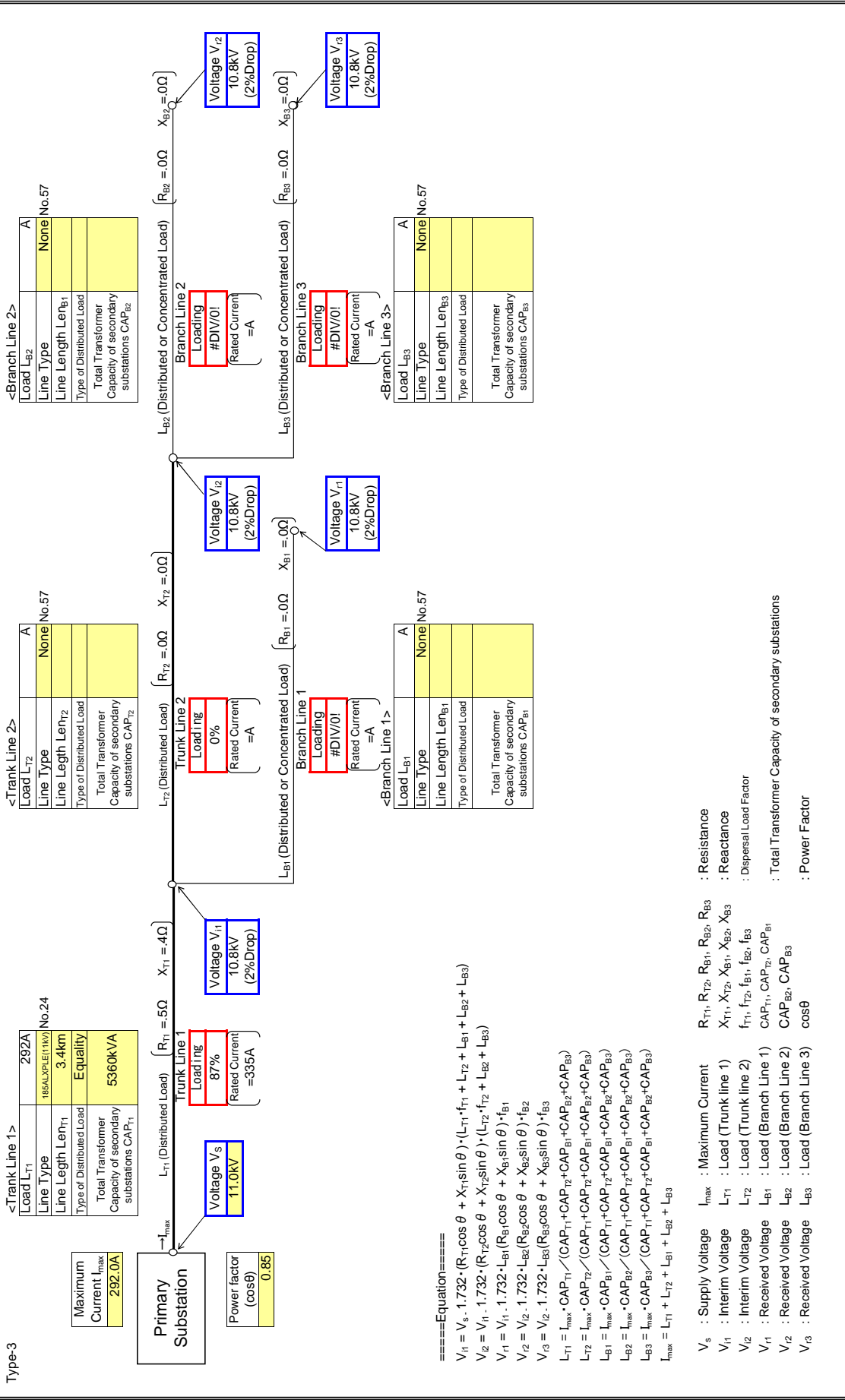
$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{11} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{12} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{13} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{14} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{15} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

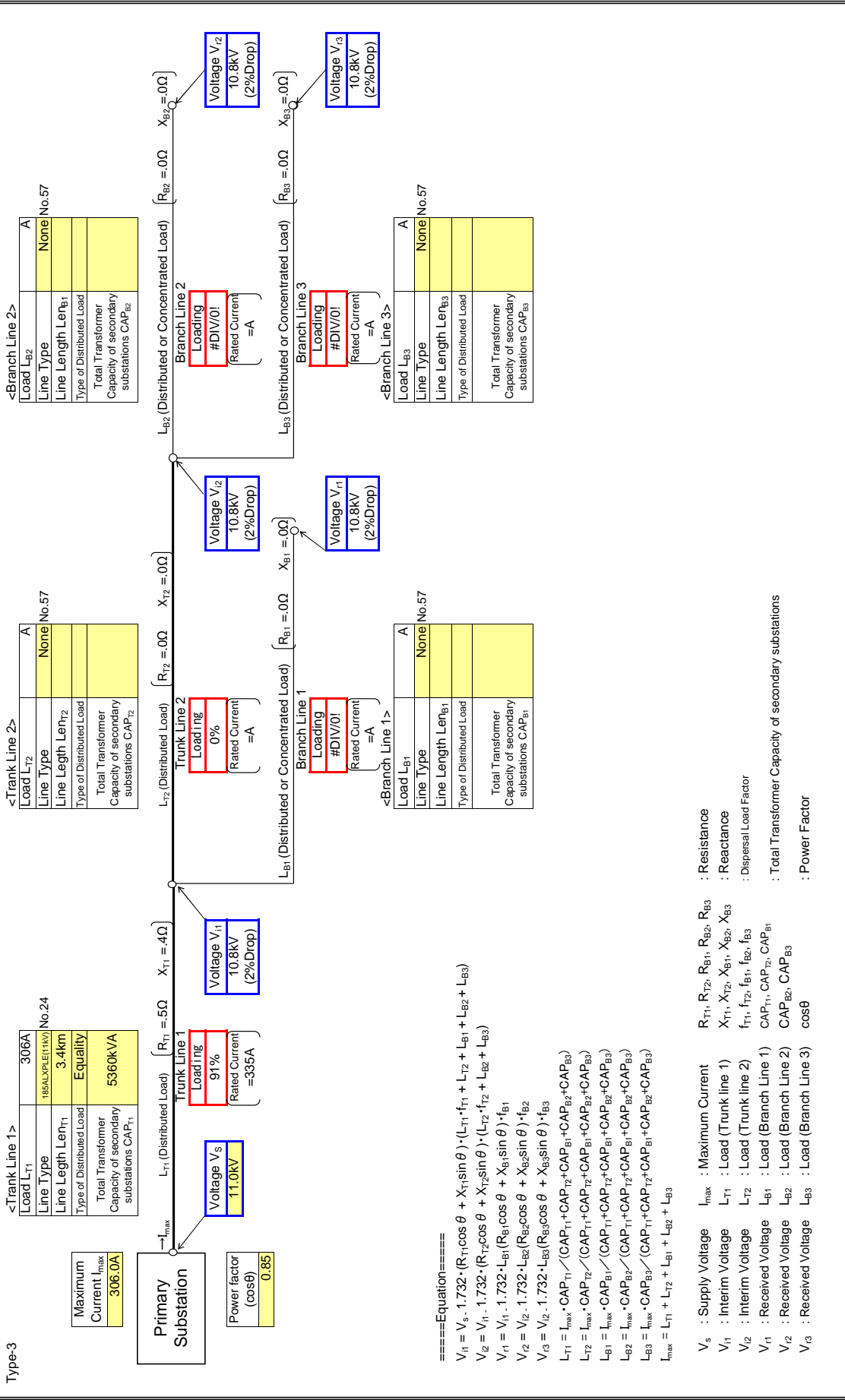
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

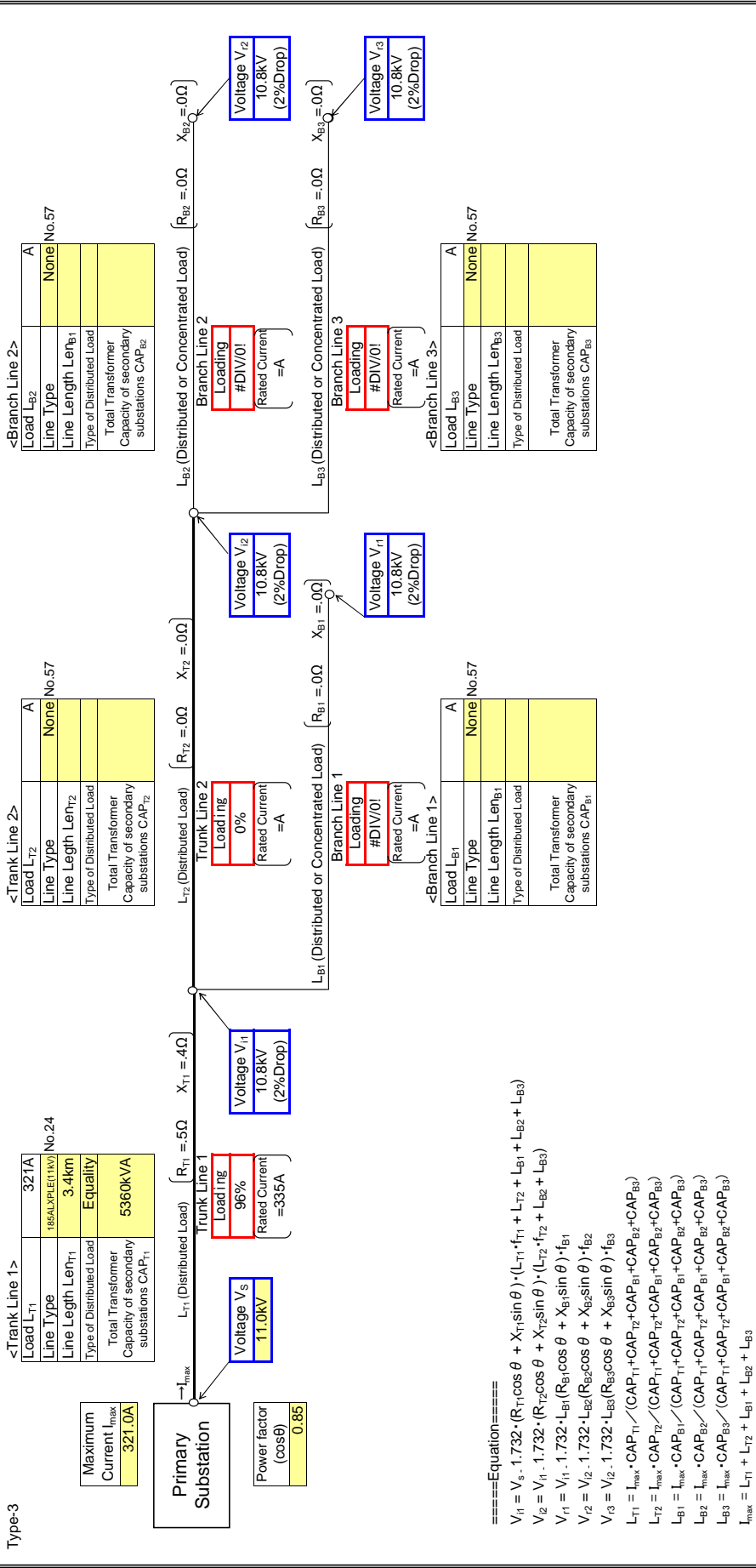
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

Input data in colored cells



====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{i3} \cdot 1.732 \cdot L_{B3} \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

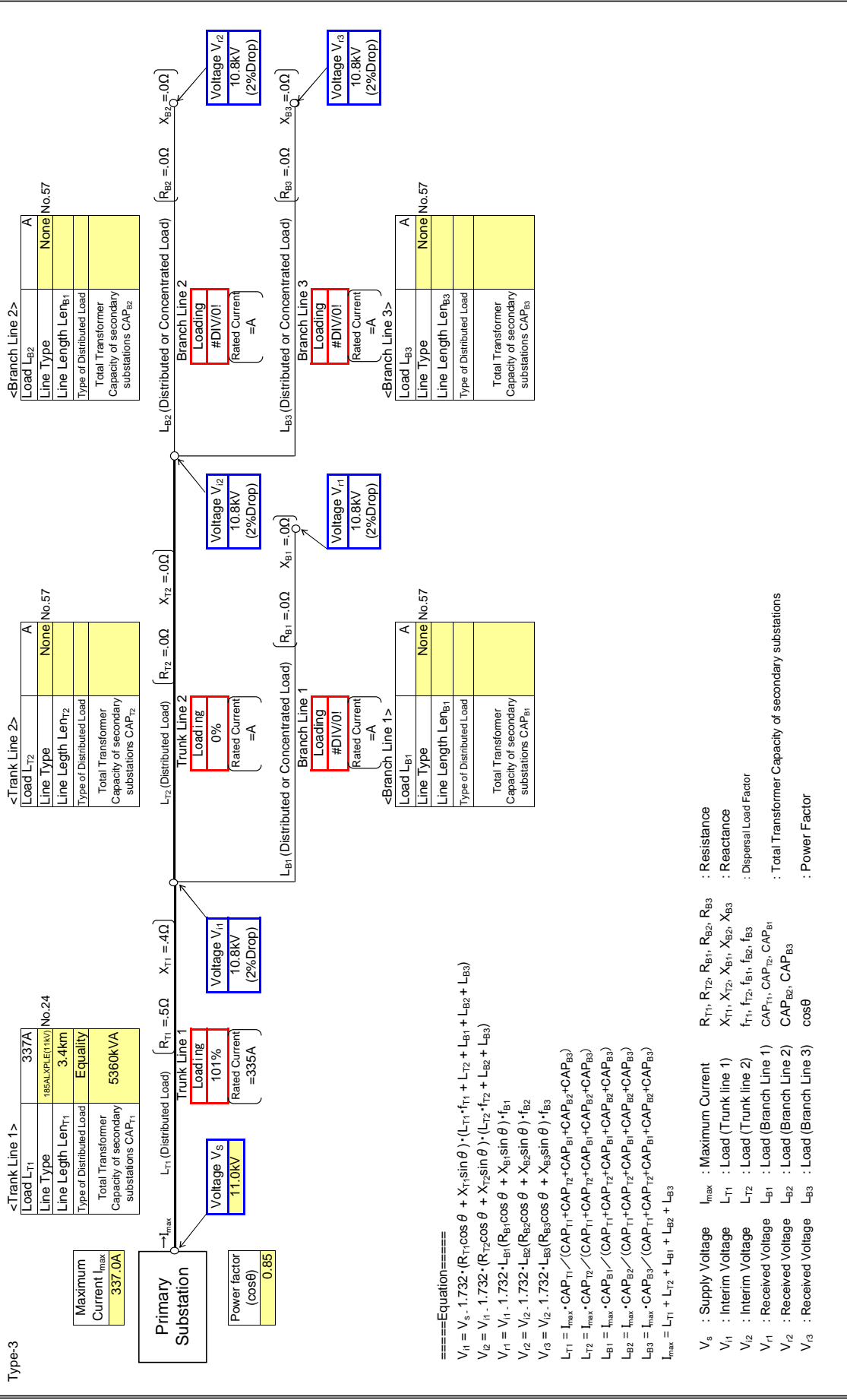
$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- V_{i1}, V_{i2} : Interim Voltage
- L_{T1}, L_{T2} : Load (Trunk line 1)
- L_{B1}, L_{B2}, L_{B3} : Load (Branch Line 1)
- V_{r1}, V_{r2}, V_{r3} : Received Voltage
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

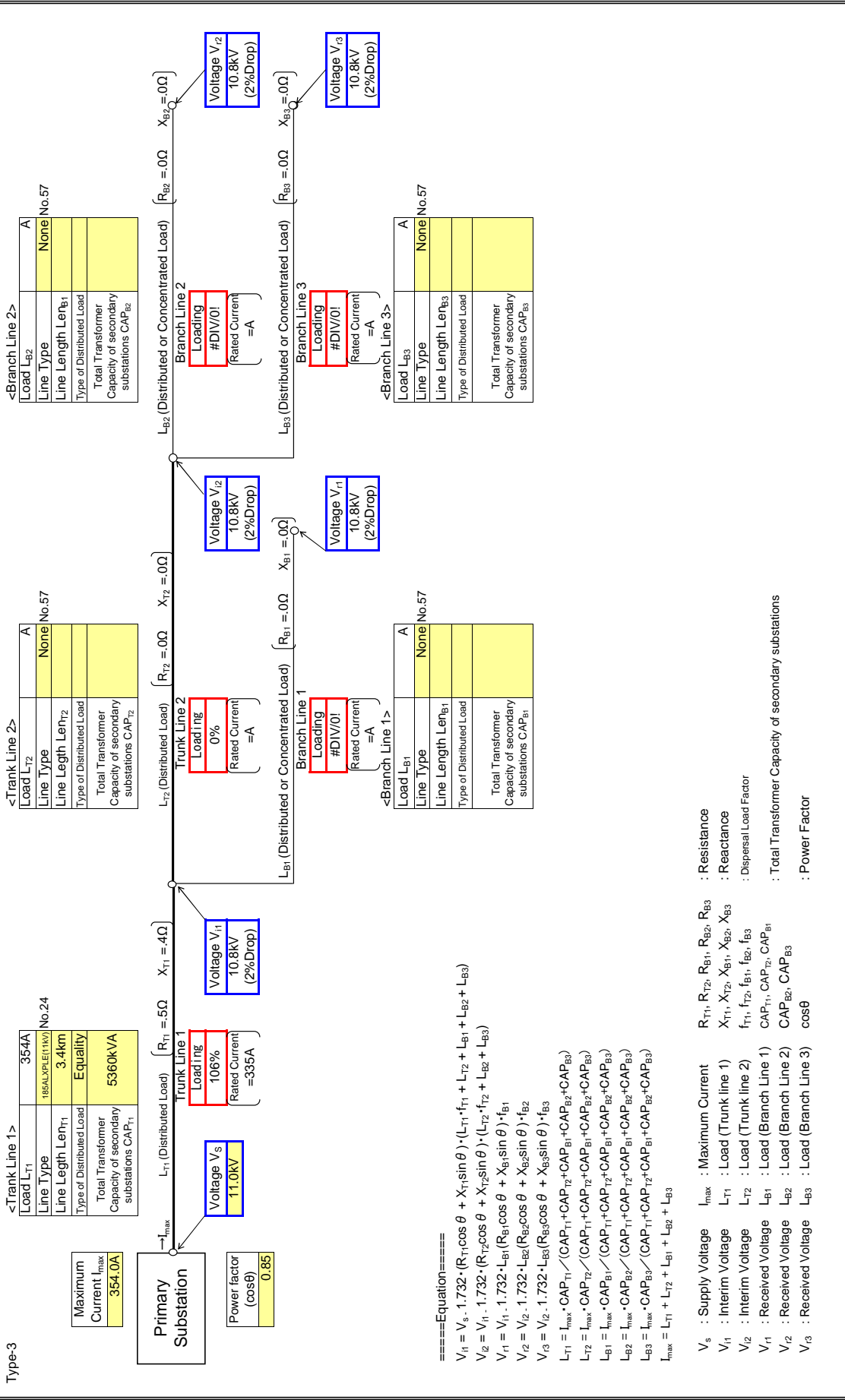
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

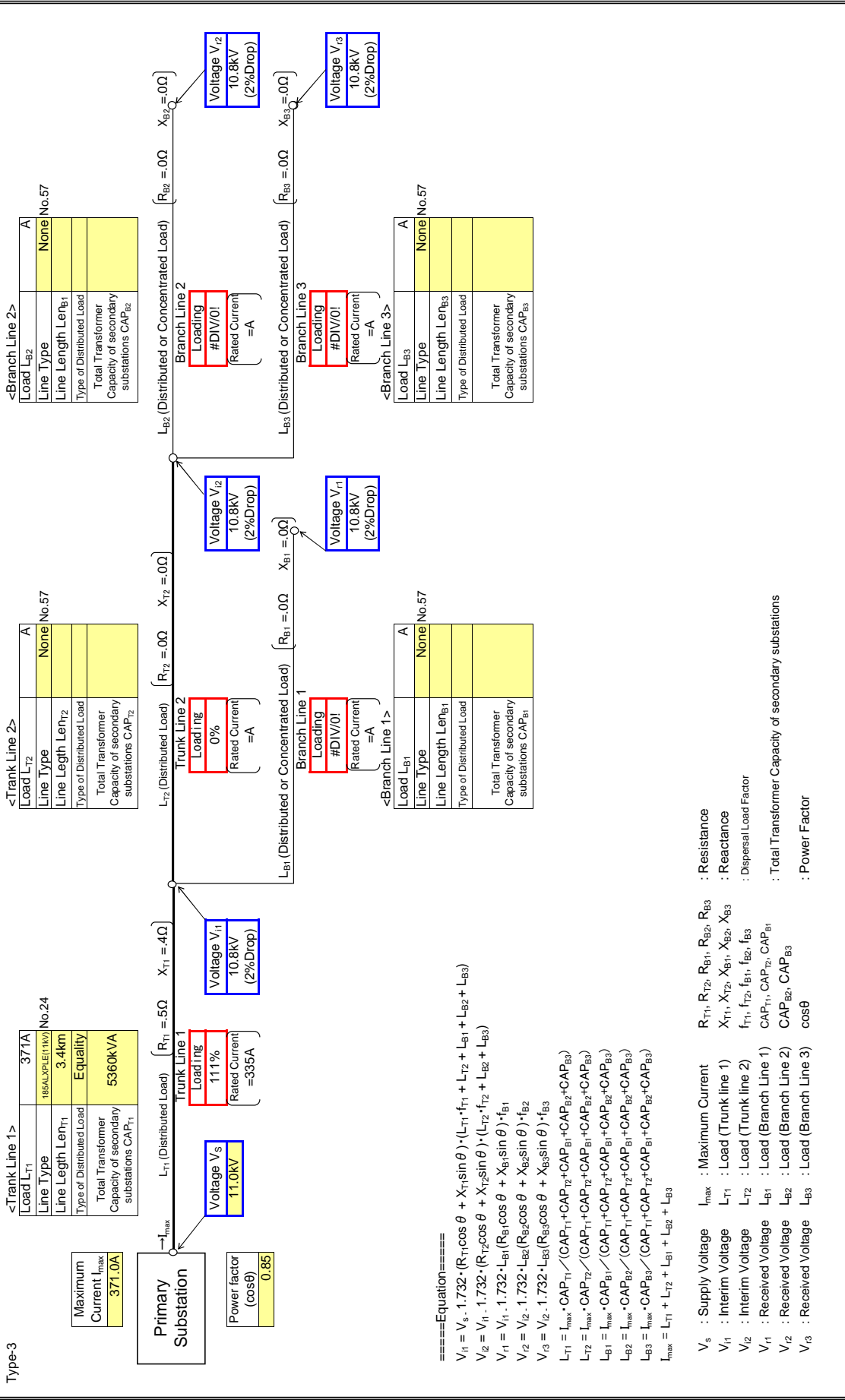
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

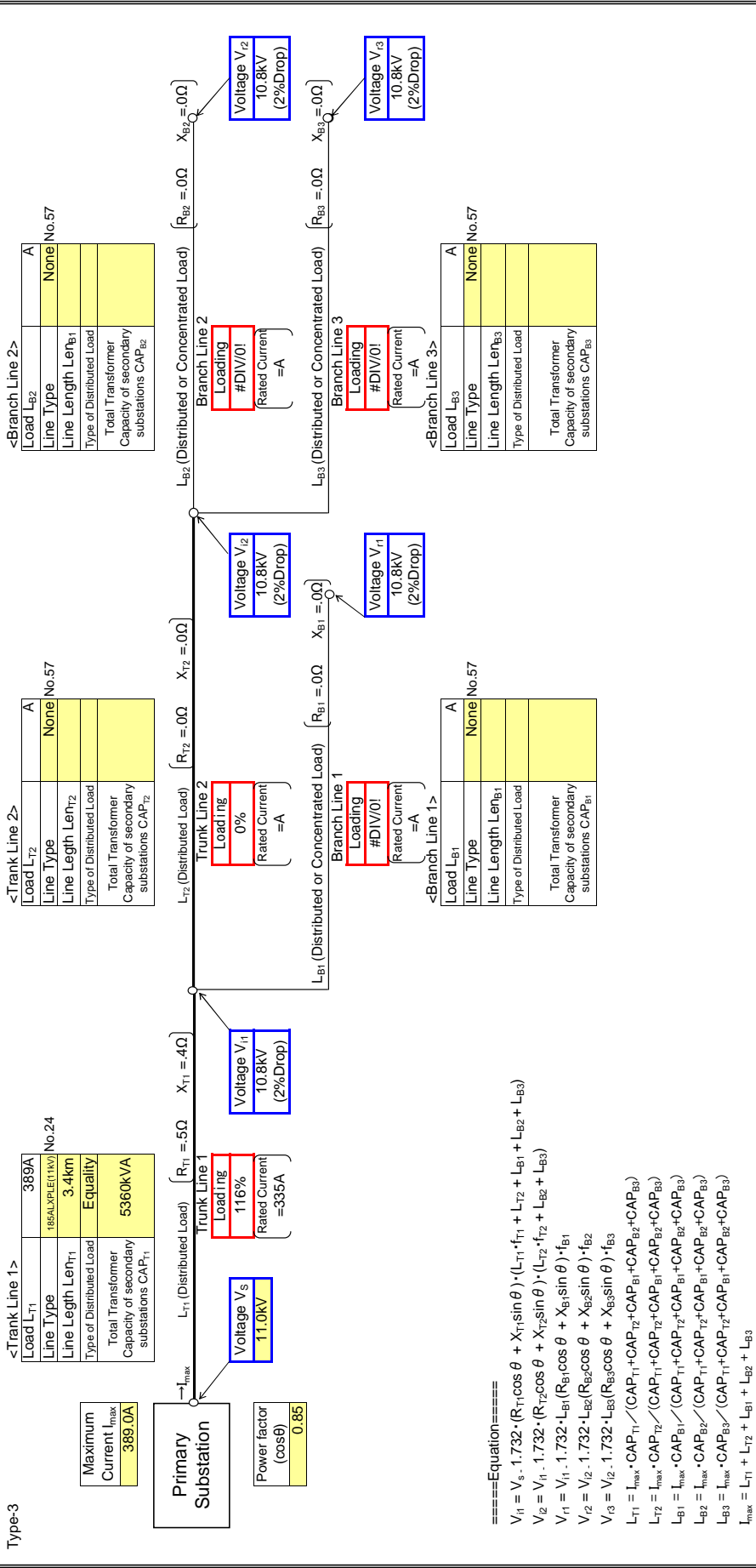
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F01

: Input data in colored cells



- V_s : Supply Voltage
- V_{i1} : Interim Voltage
- V_{i2} : Interim Voltage
- V_{r1} : Received Voltage
- V_{r2} : Received Voltage
- V_{r3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos\theta$: Power Factor

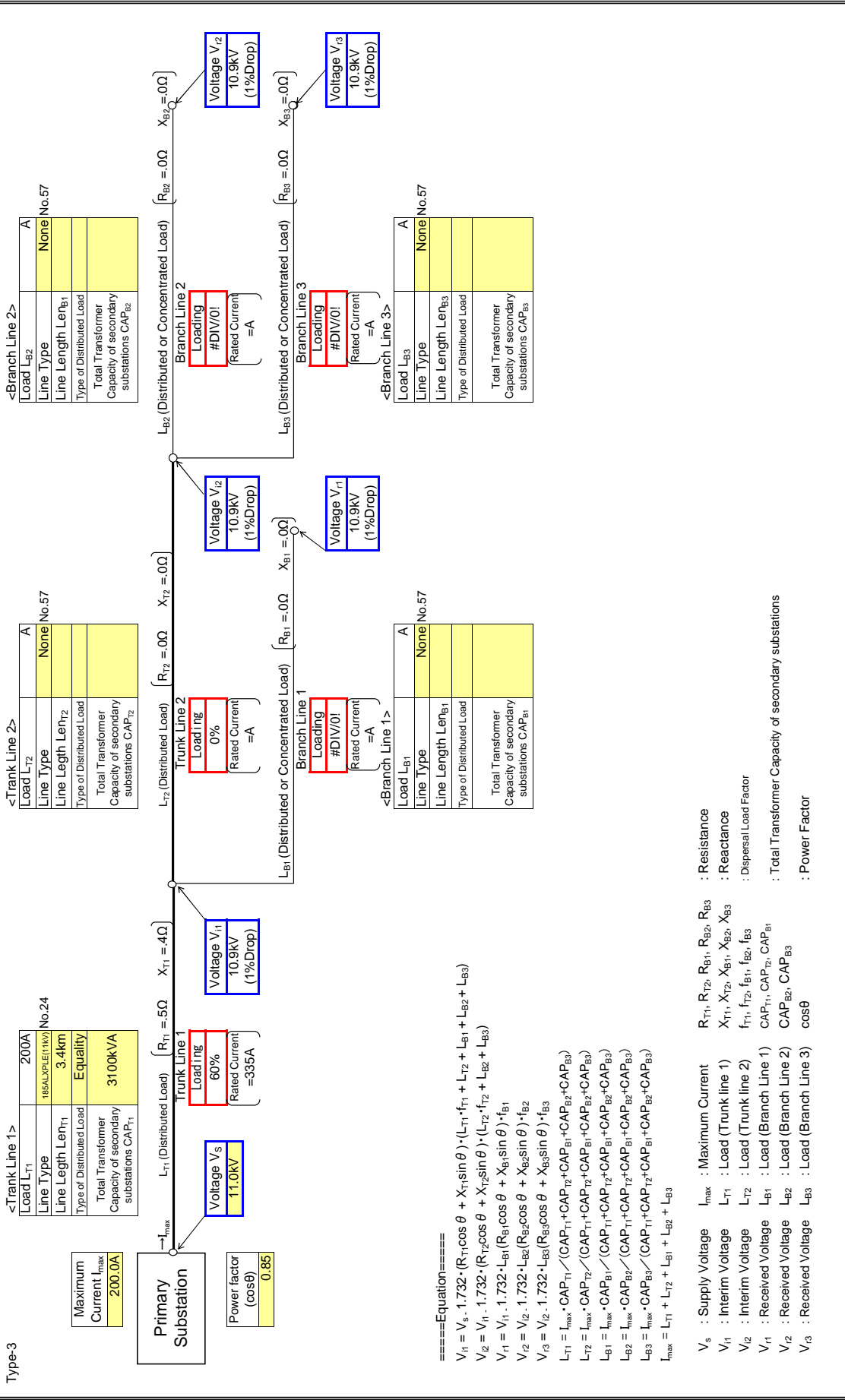
====Equation====
 $V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

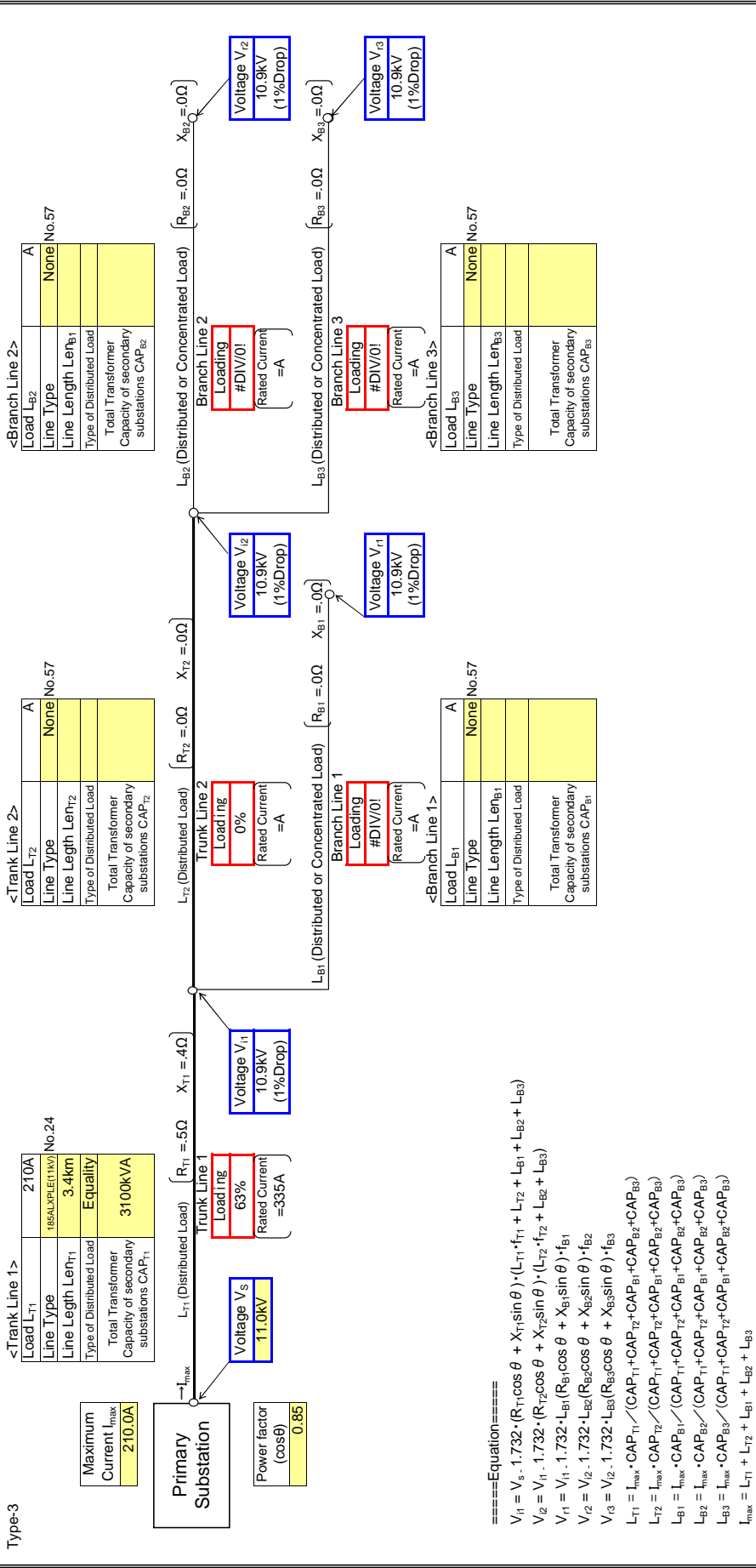
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

: Input data in colored cells



====Equation====

$$V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{B1} = V_{T1} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot (L_{B1} \cdot f_{B1} + L_{B2} + L_{B3})$$

$$V_{B2} = V_{B1} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot (L_{B2} \cdot f_{B2} + L_{B3})$$

$$V_{B3} = V_{B2} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

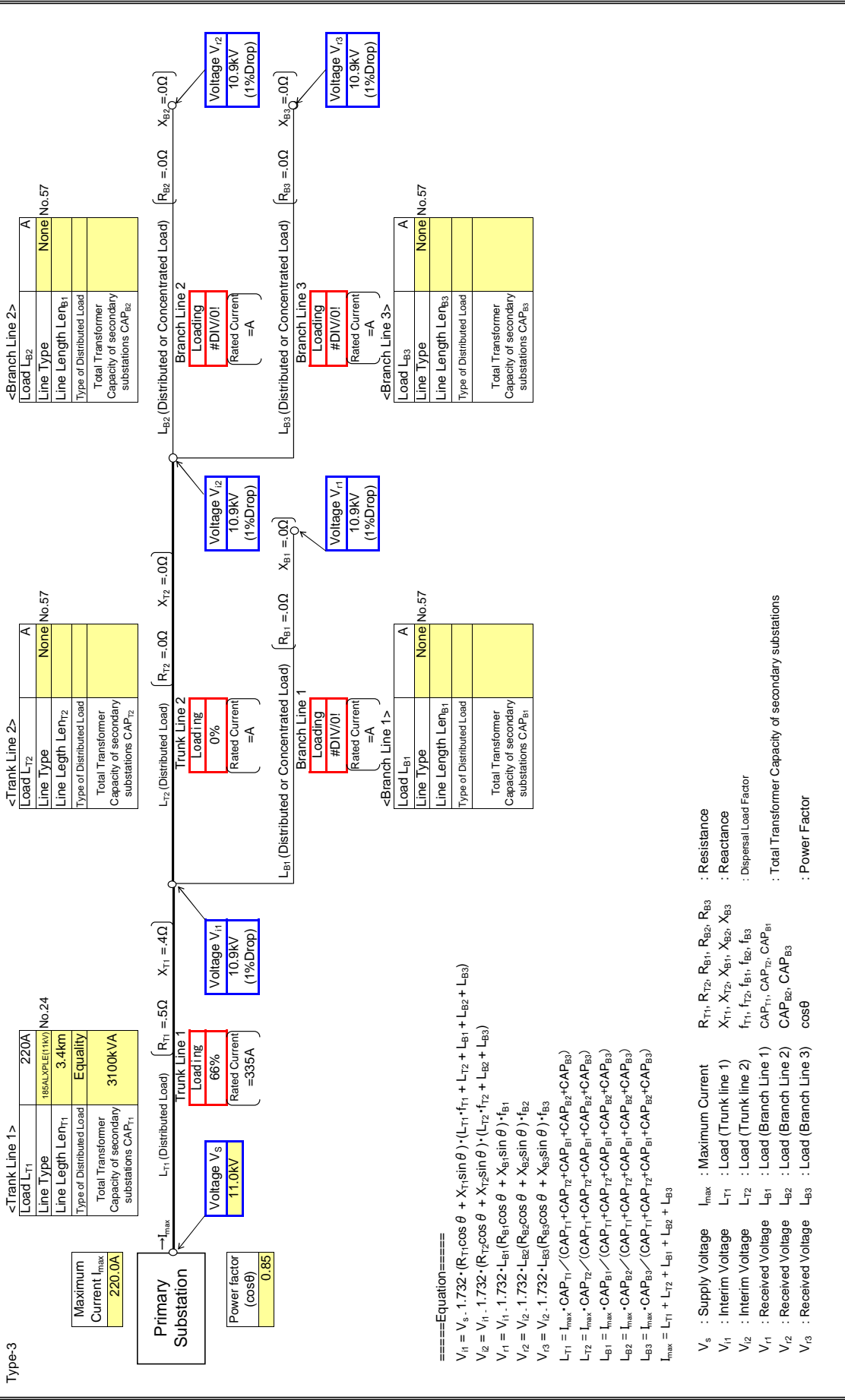
$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

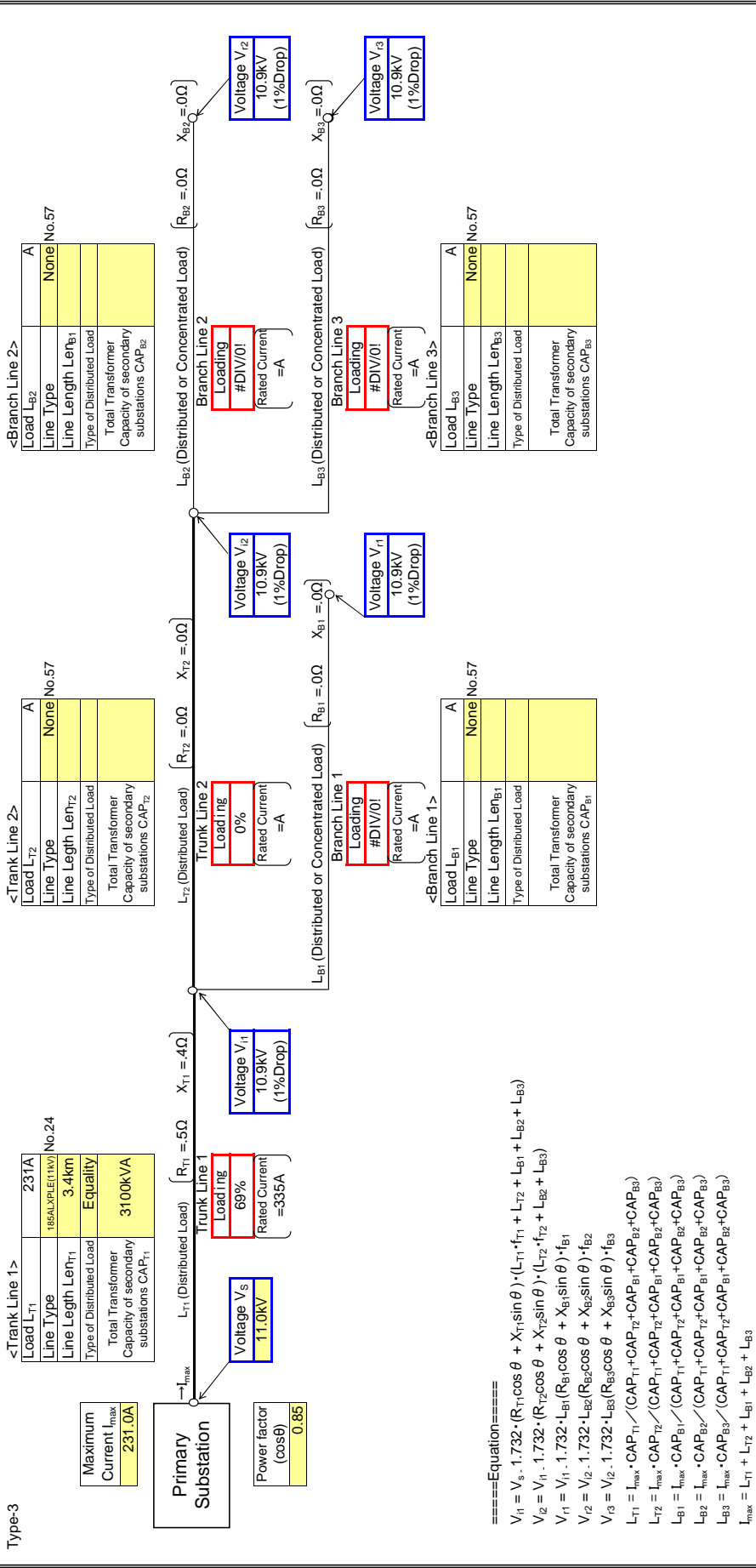
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

: Input data in colored cells



- V_s : Supply Voltage
- V_{i1} : Interim Voltage
- V_{i2} : Interim Voltage
- V_{r1} : Received Voltage
- V_{r2} : Received Voltage
- V_{r3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos\theta$: Power Factor

====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

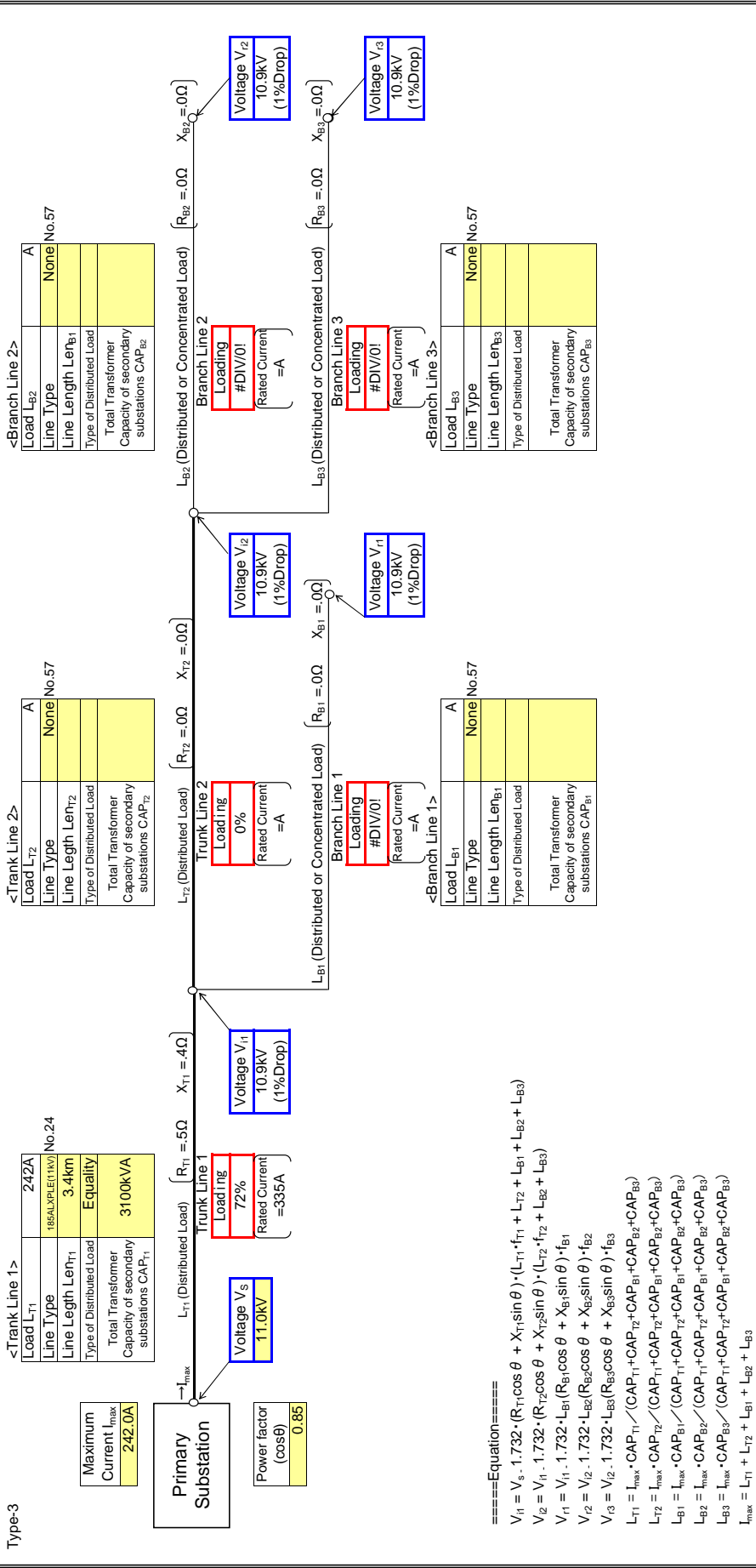
$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

: Input data in colored cells



====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

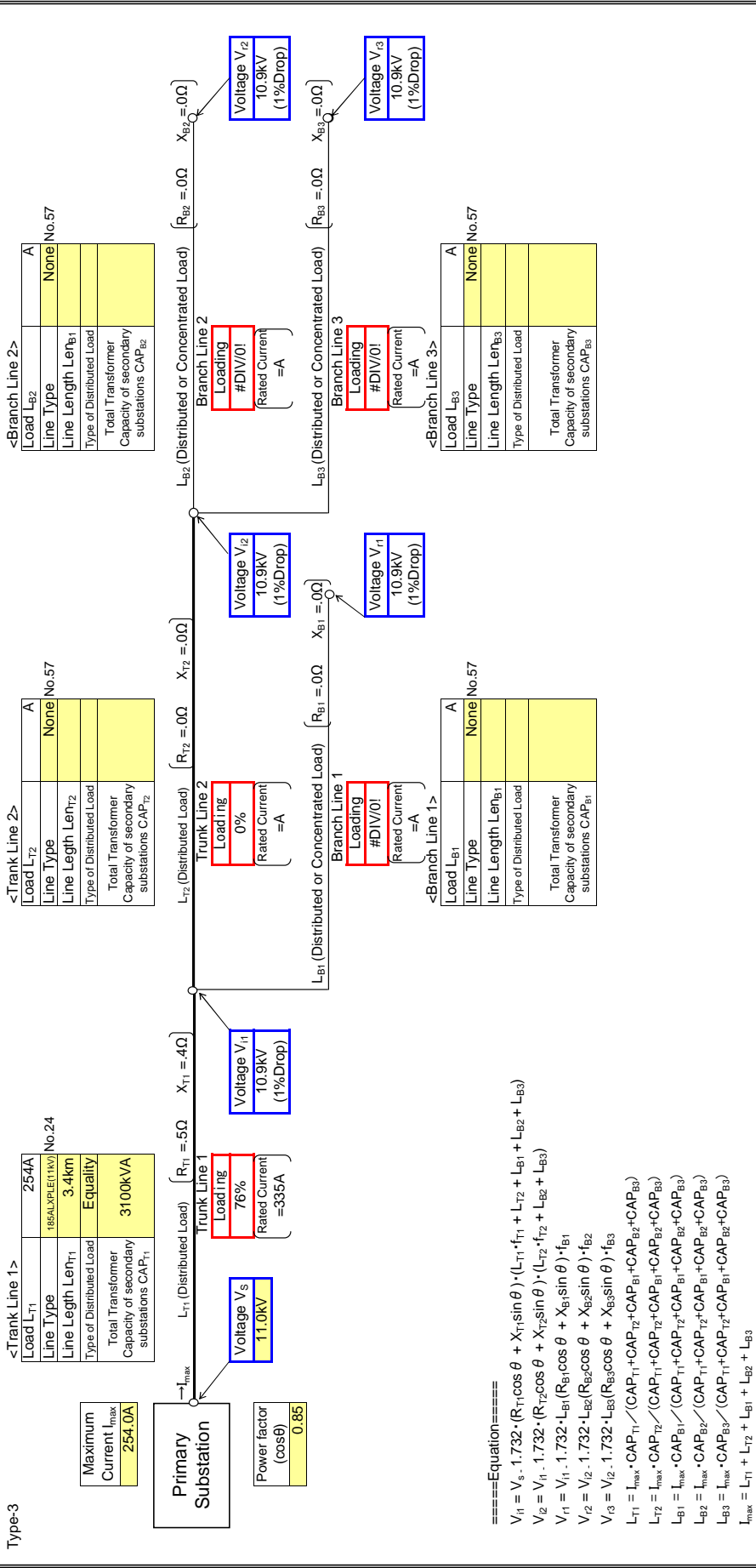
$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- V_{i1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- V_{i2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
- V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

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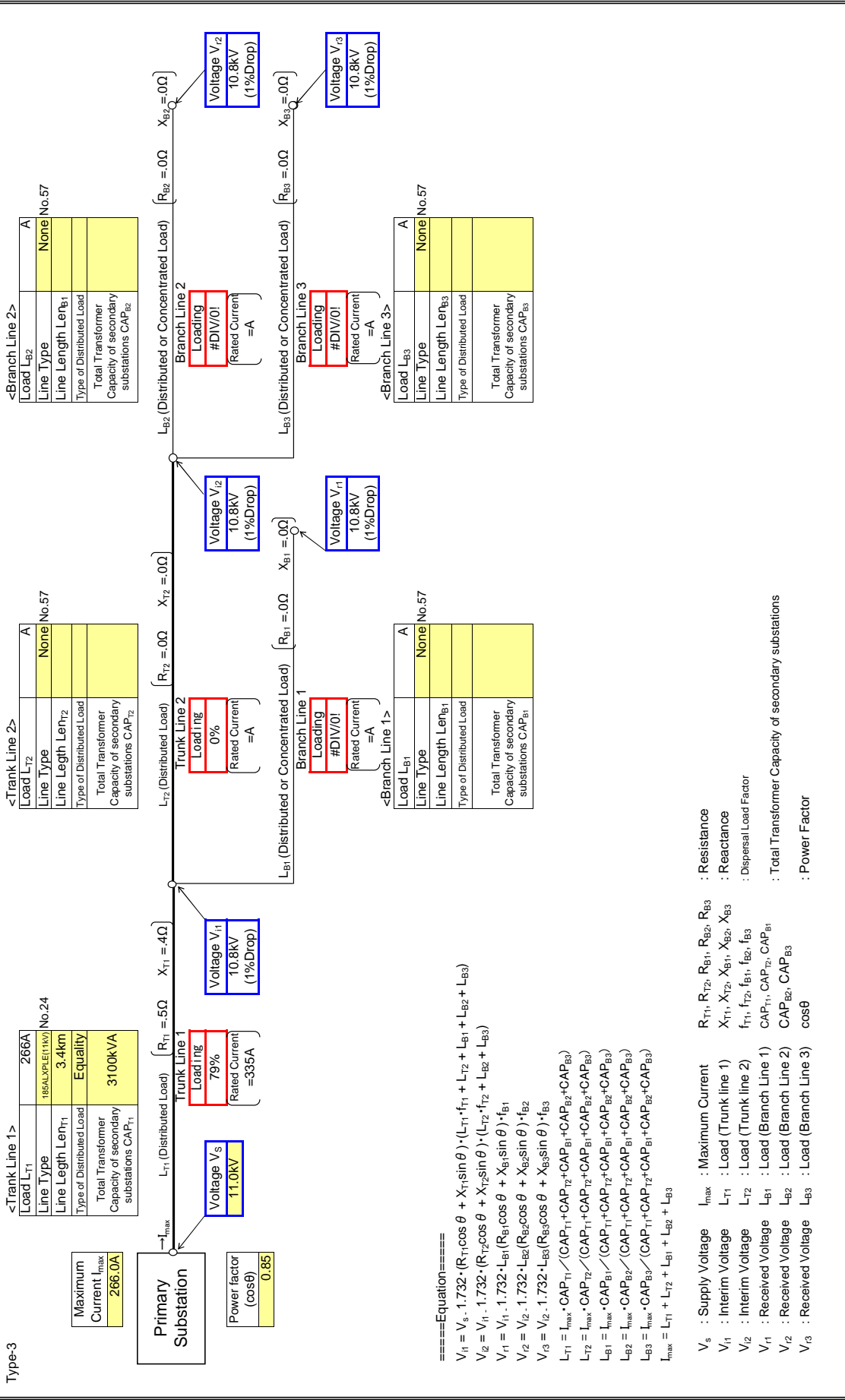


- ====Equation====
- $$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$
- $$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$
- $$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$
- $$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$
- $$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$
- $$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$
- $$I_{max} = I_{T1} + I_{T2} + I_{B1} + I_{B2} + I_{B3}$$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{r1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{r2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

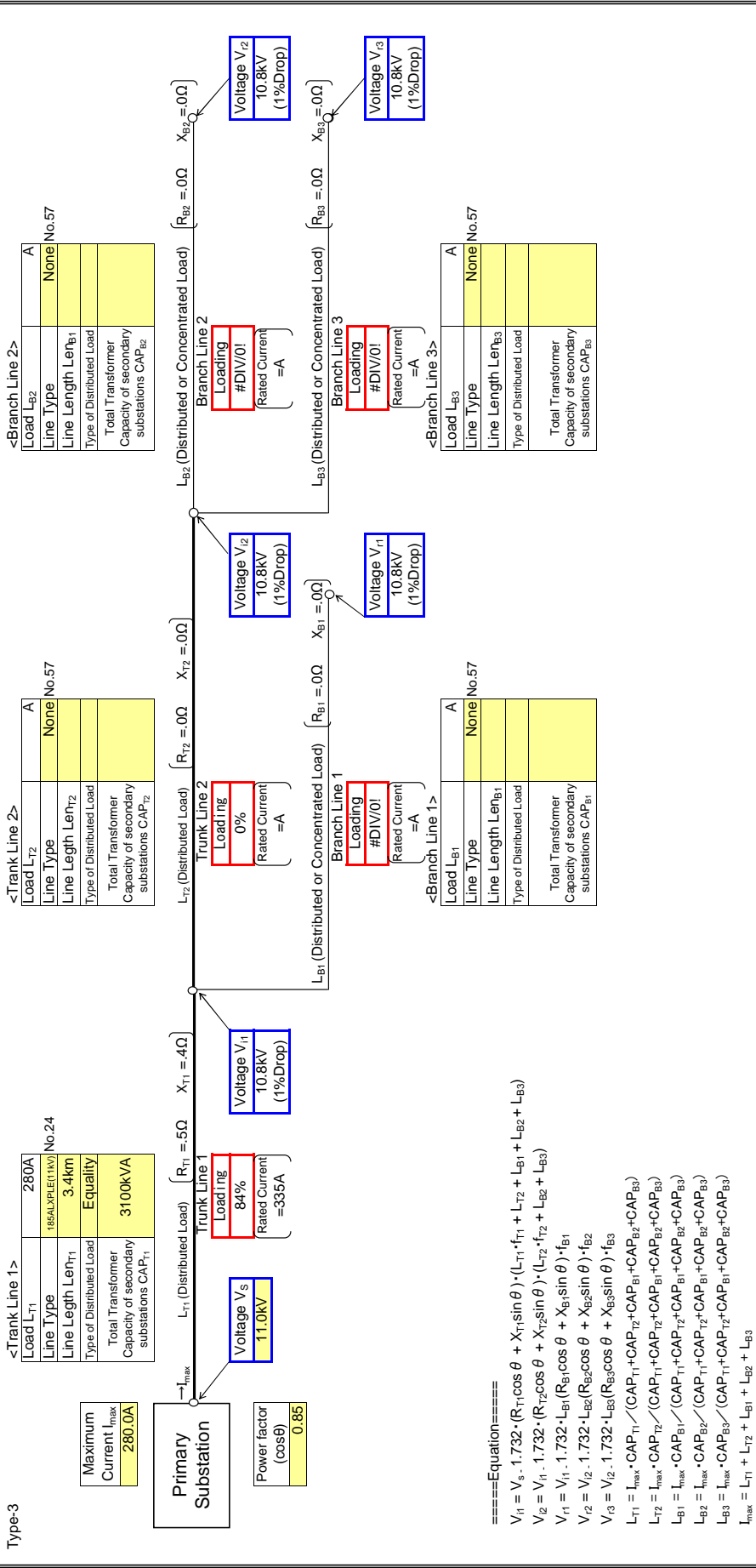
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

: Input data in colored cells



====Equation====
 $V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{r1} = V_{r1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{r2} = V_{r2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{r3} = V_{r2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

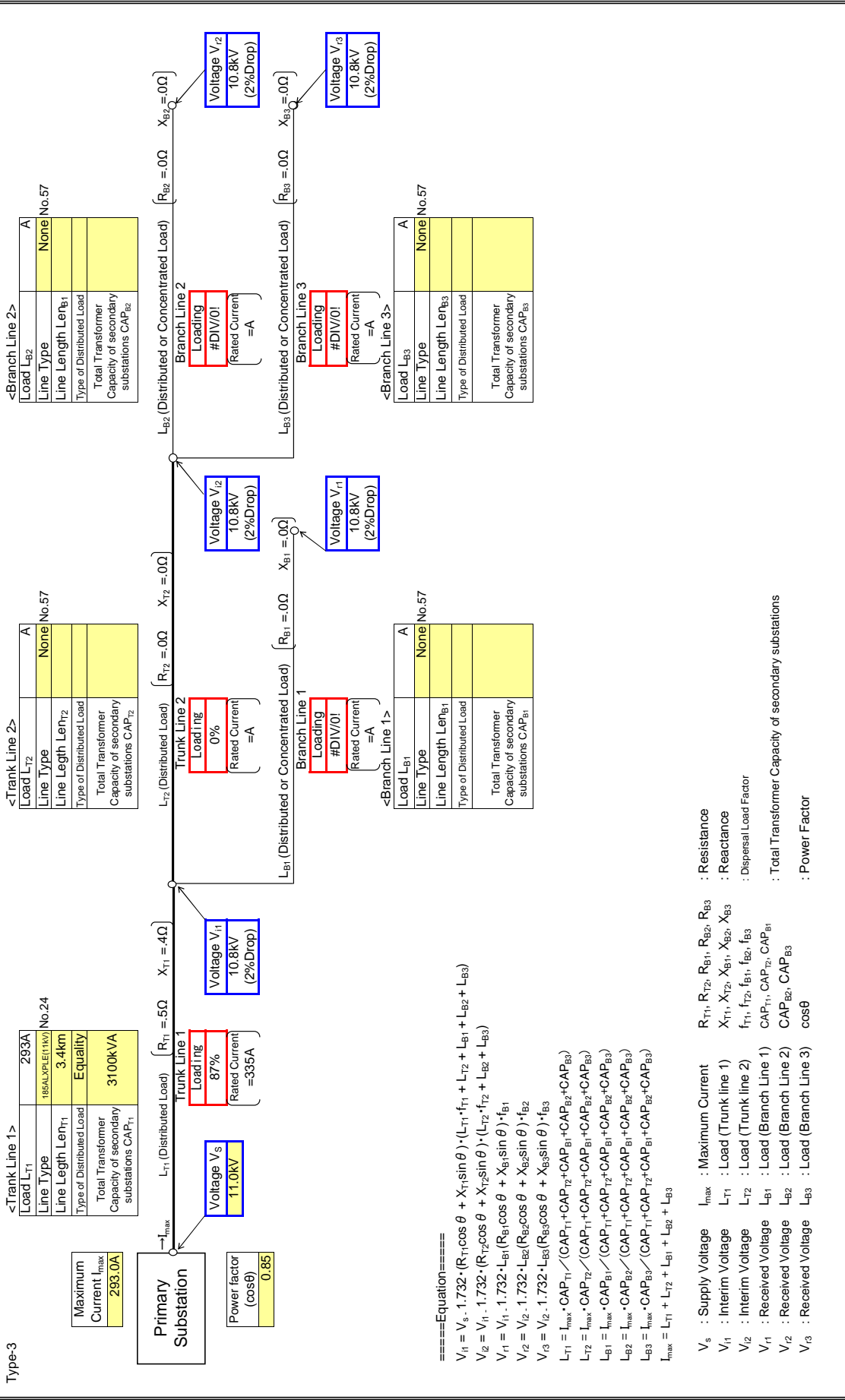
$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

- V_s : Supply Voltage
- V_{r1} : Interim Voltage
- V_{r2} : Interim Voltage
- V_{r1} : Received Voltage
- V_{r2} : Received Voltage
- V_{r3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos\theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

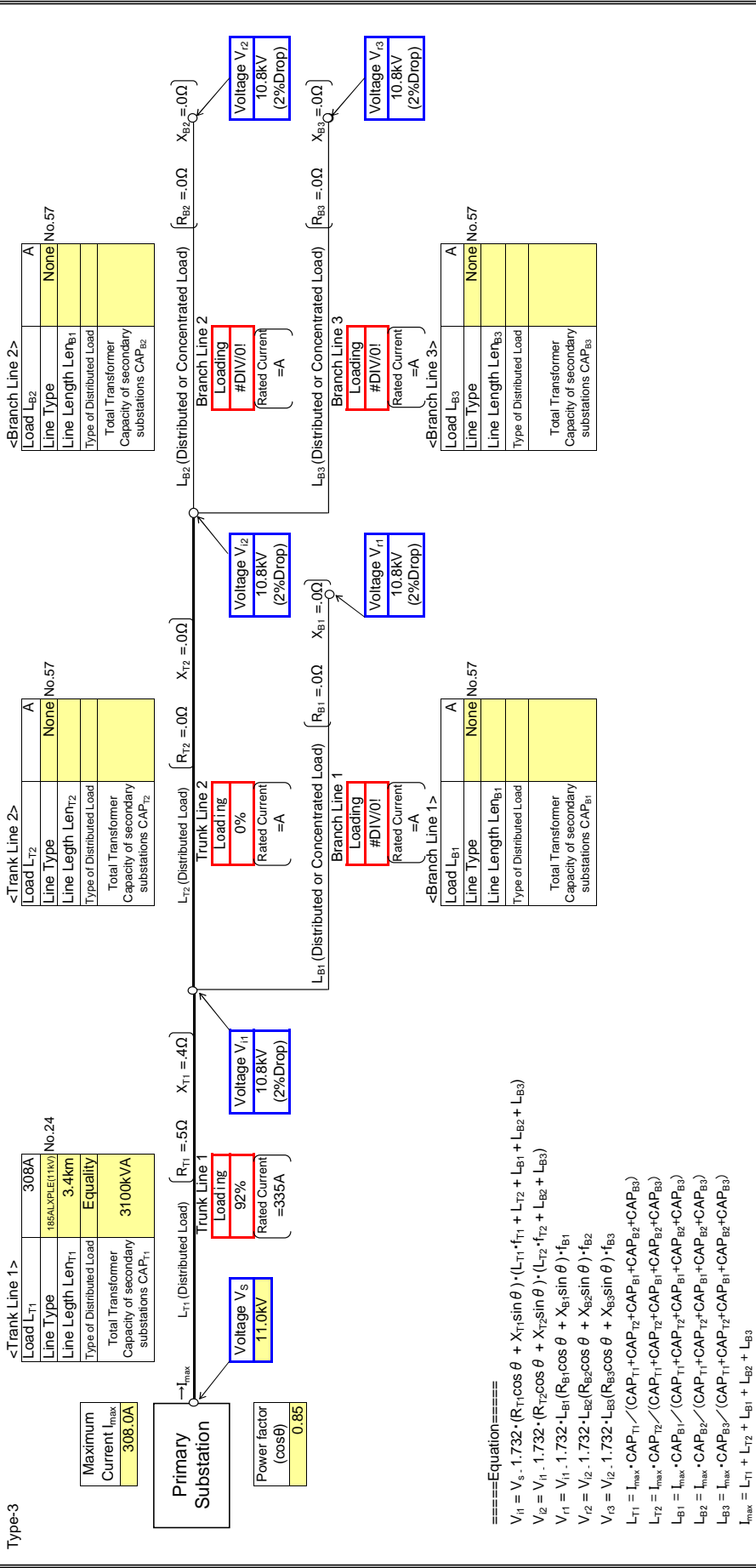
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{r1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{r2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

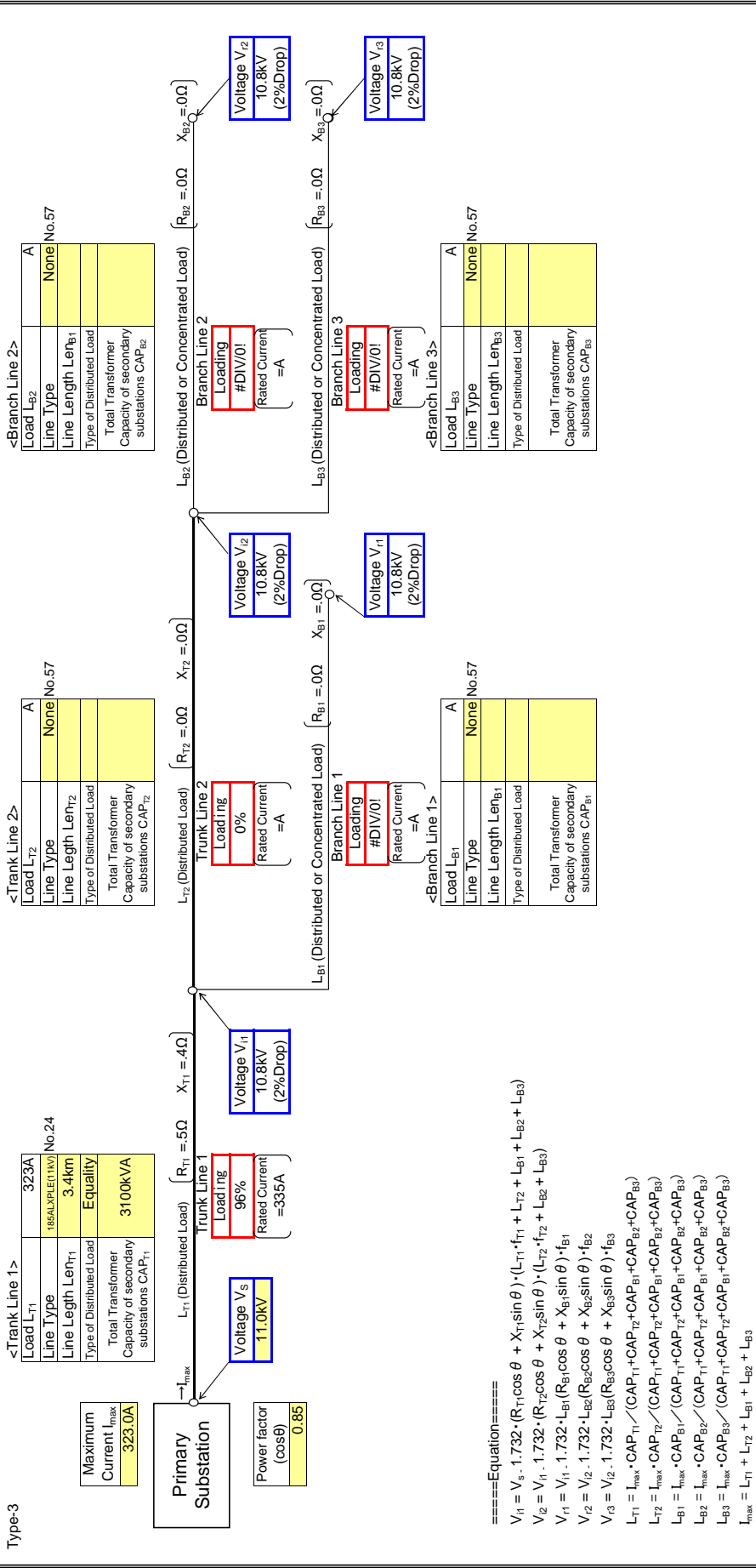
$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

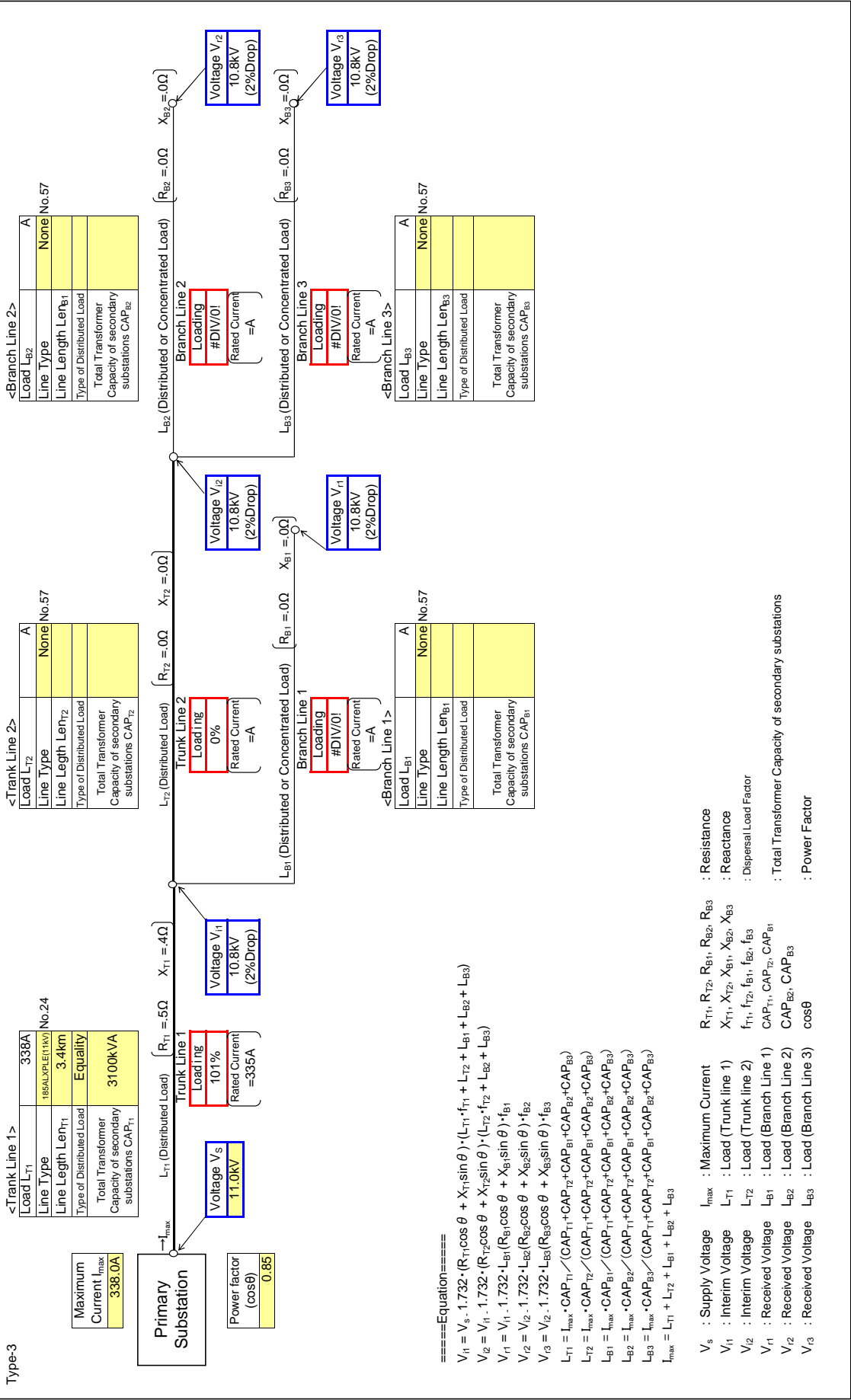
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION F
Feeder Name	F11

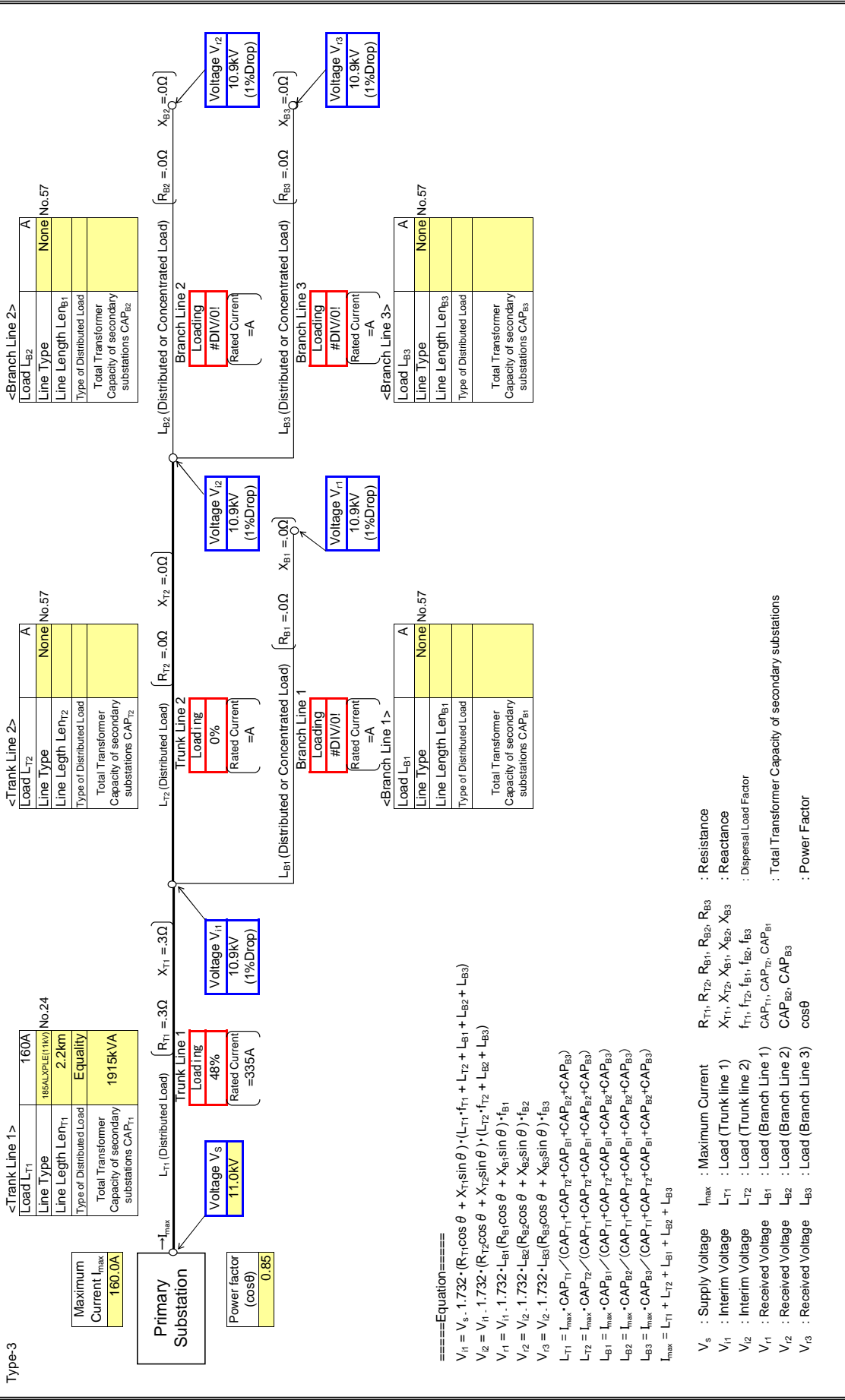
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

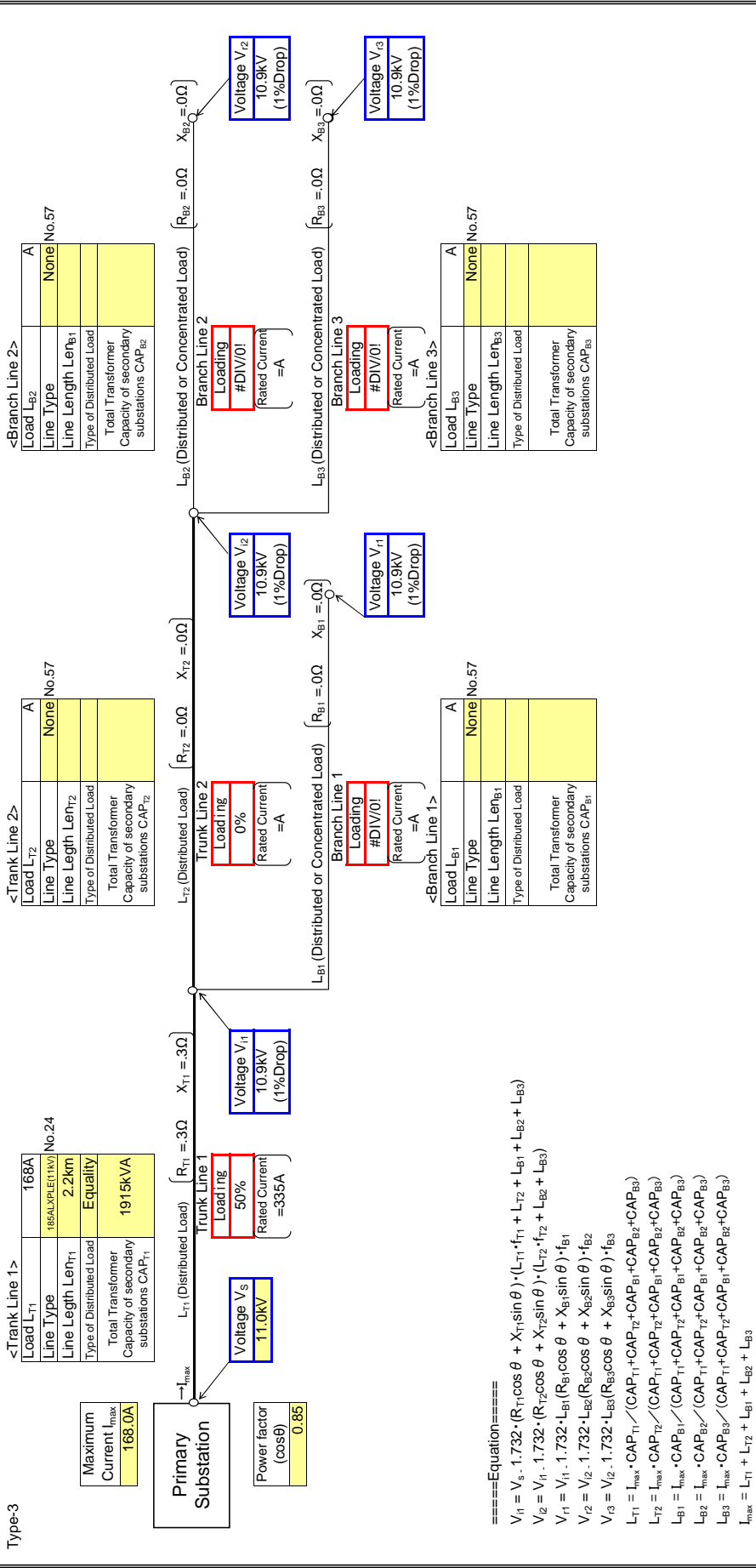
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

: Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{r1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{r2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

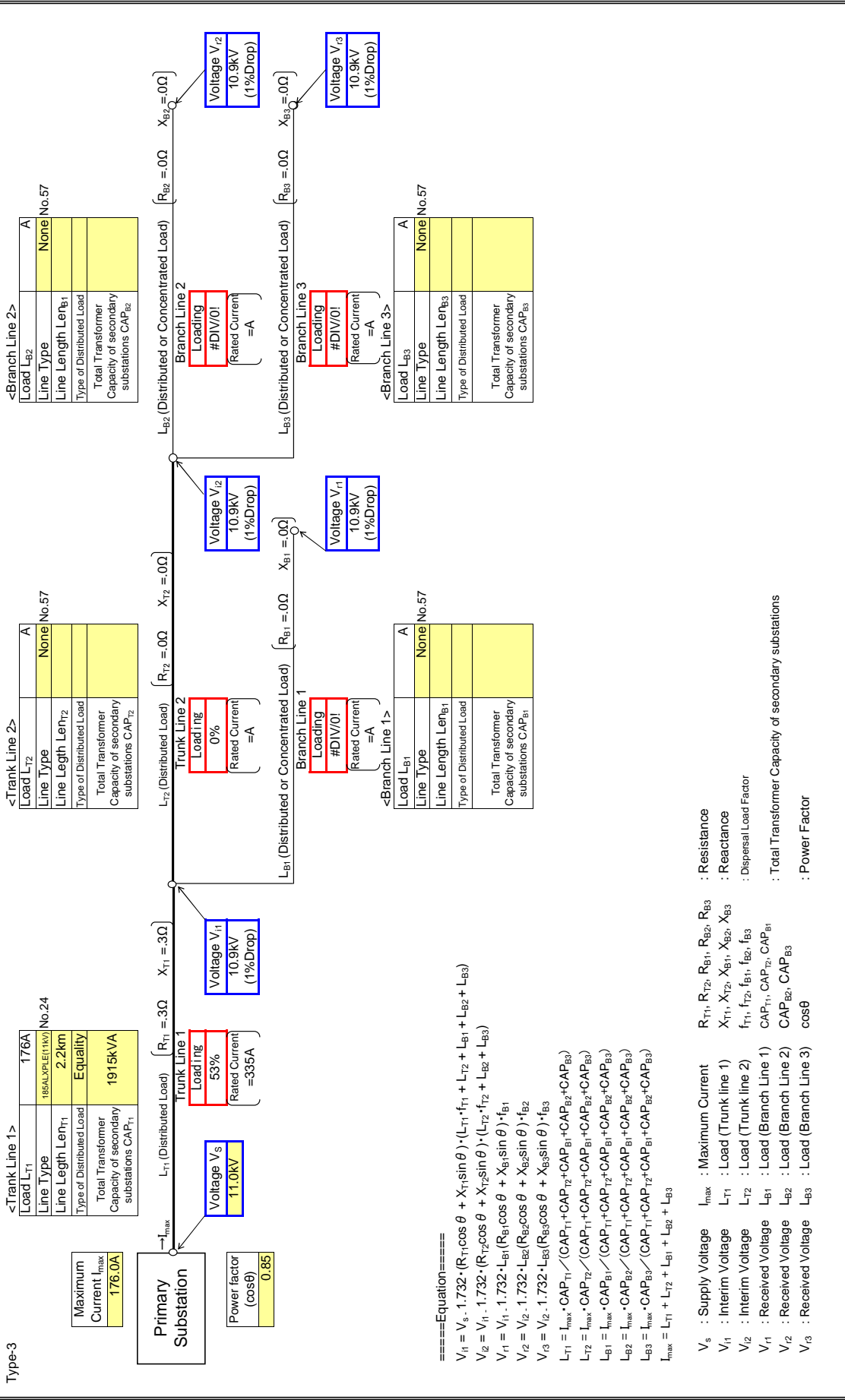
$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

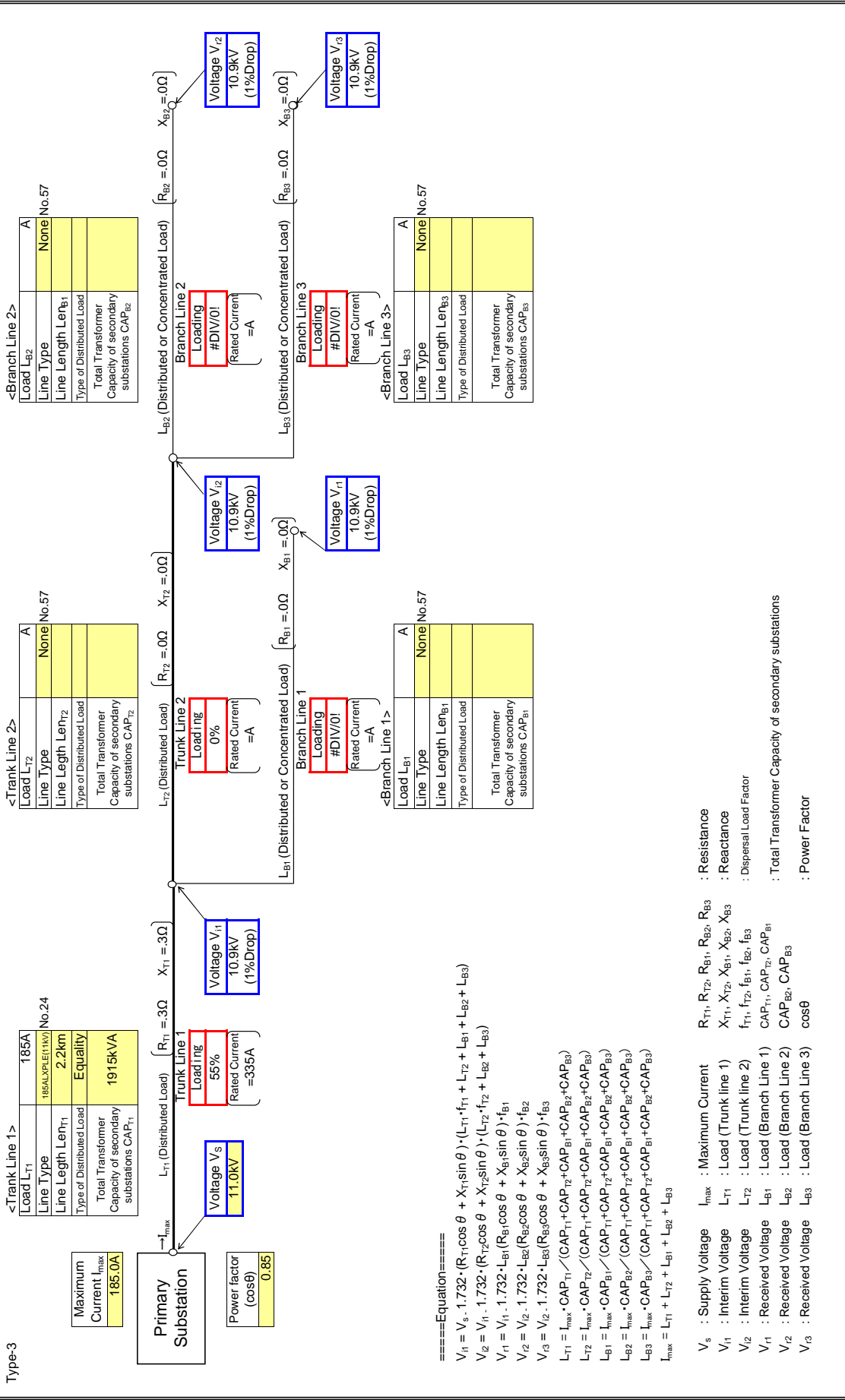
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

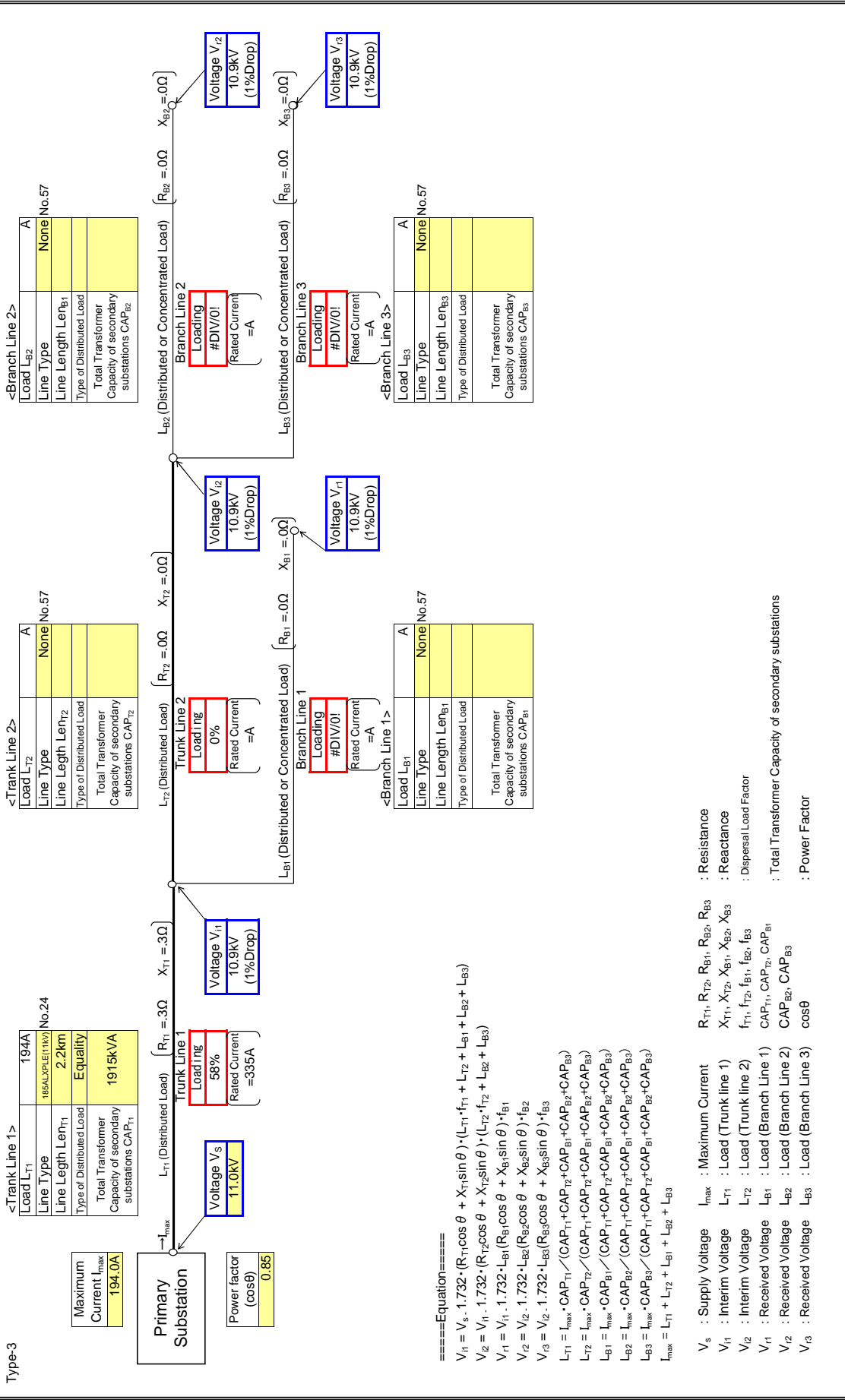
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

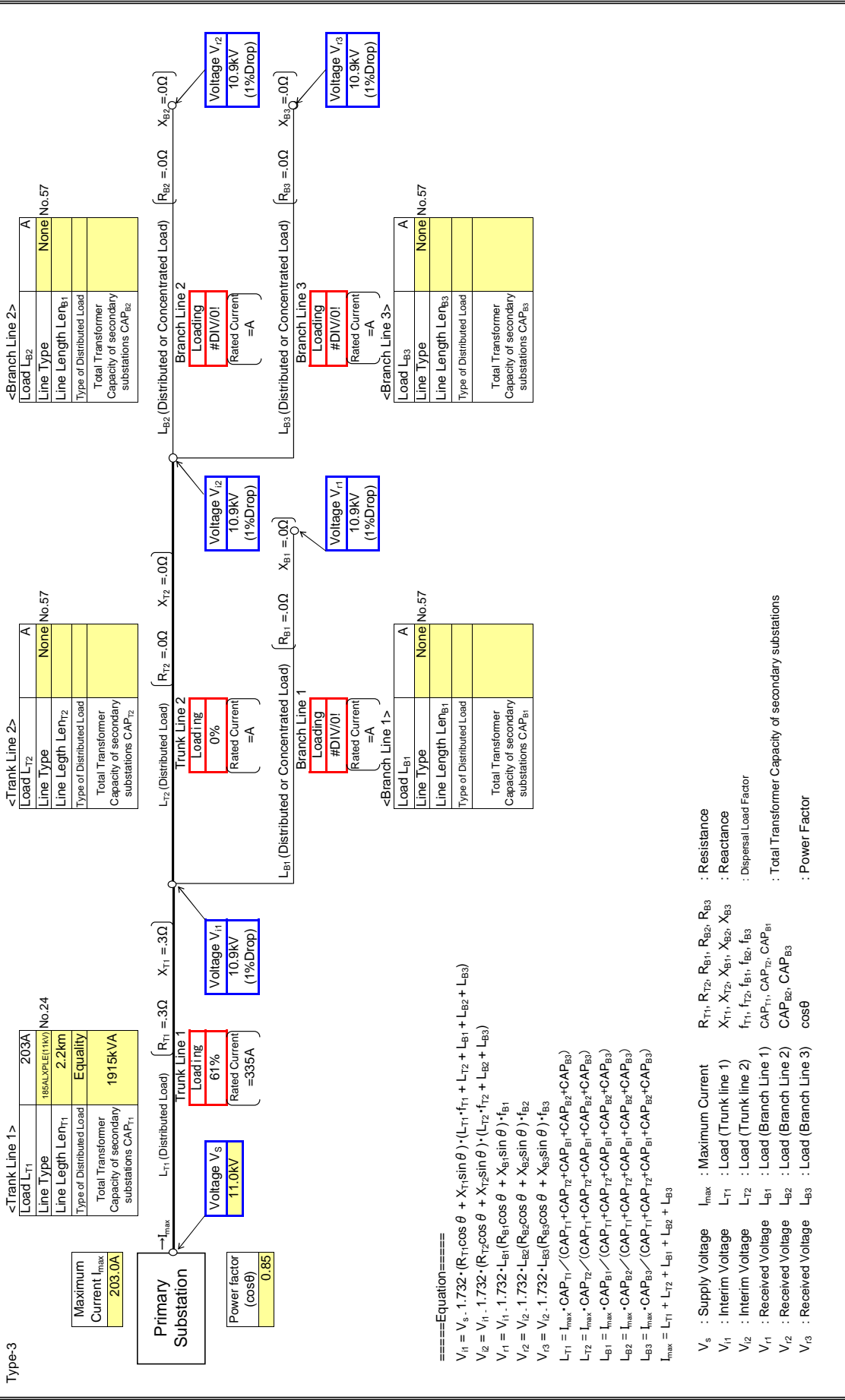
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

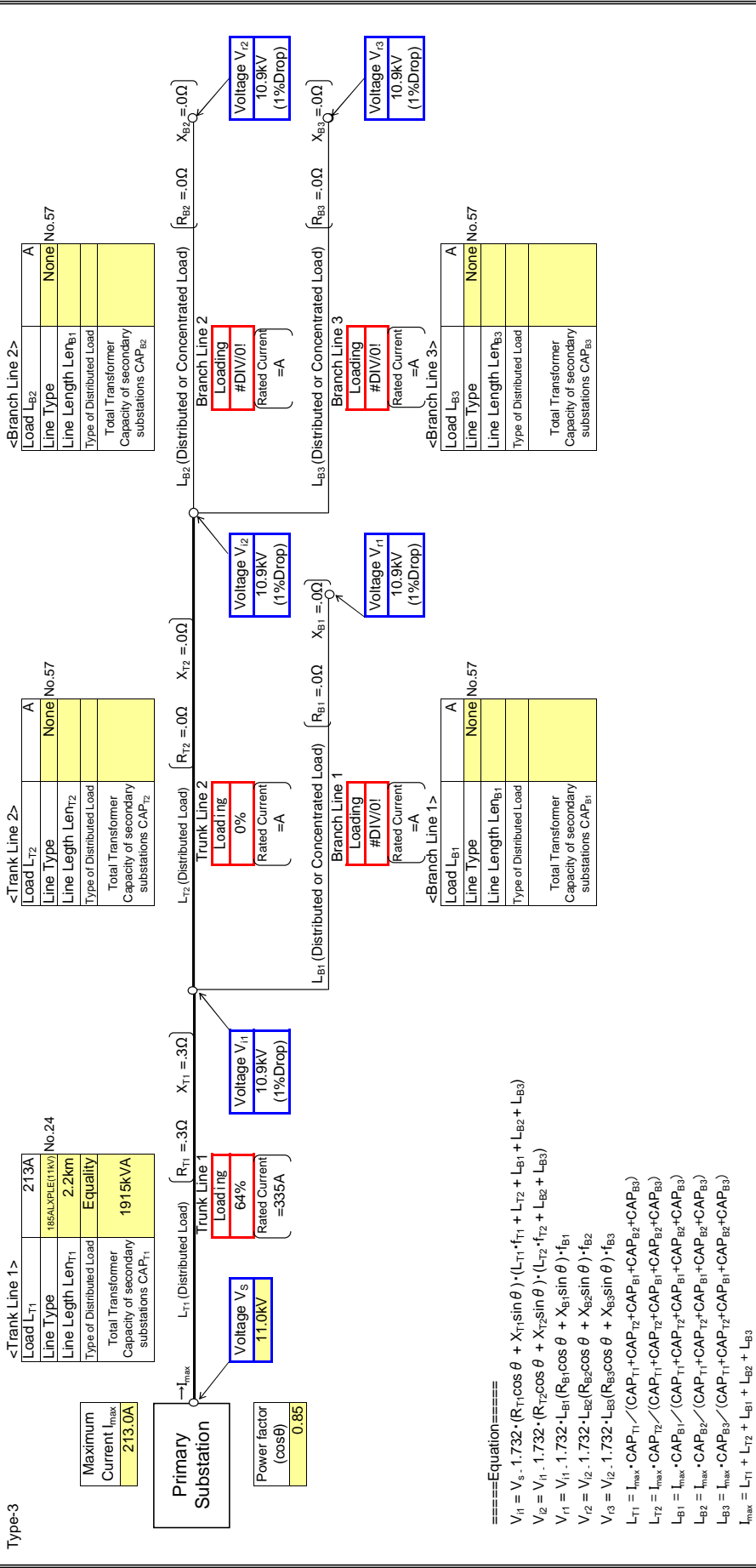
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

Input data in colored cells

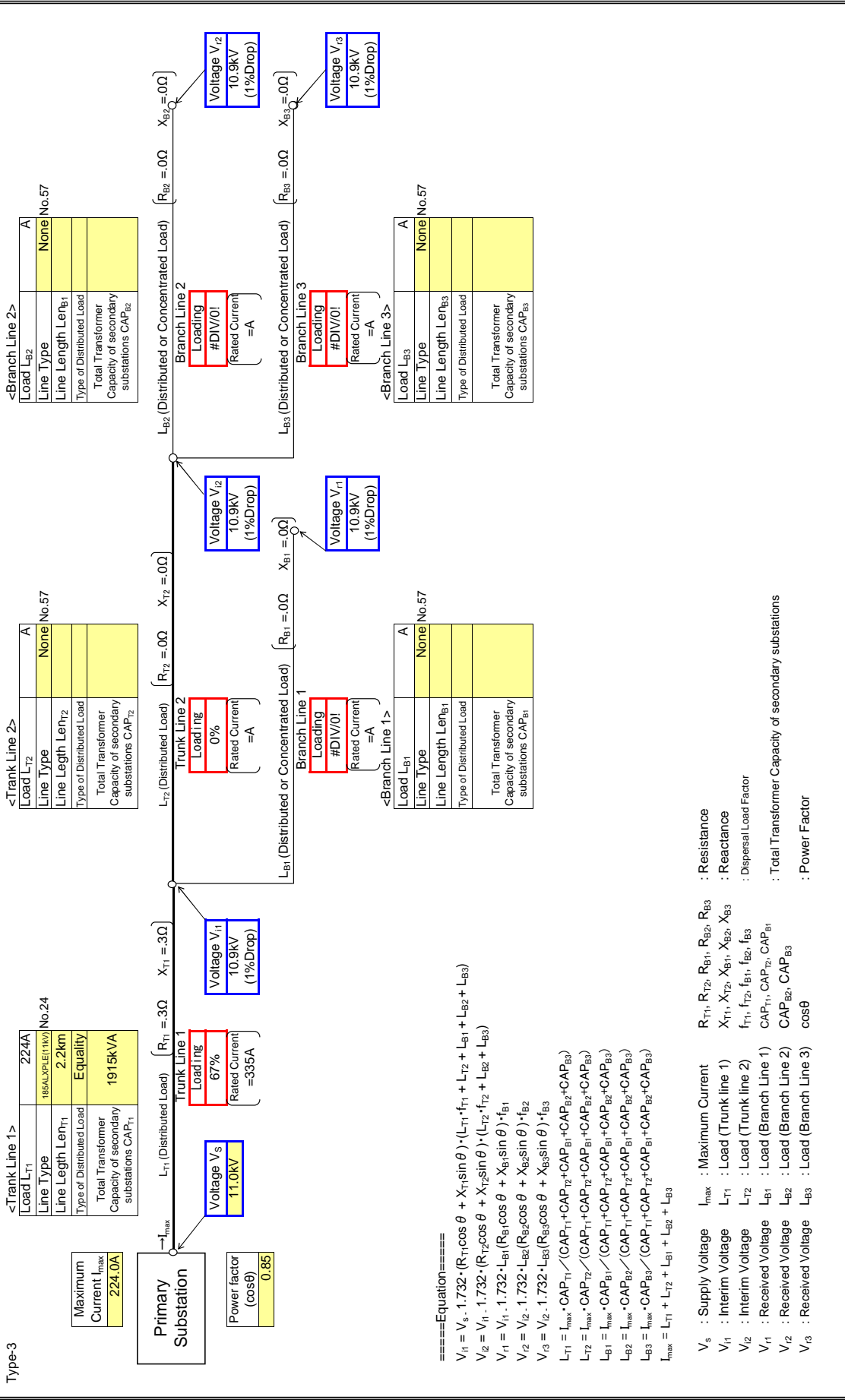


- ====Equation====
- $$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$
- $$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$
- $$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$
- $$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$
- $$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$
- $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{r1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{r2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
 V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
 V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

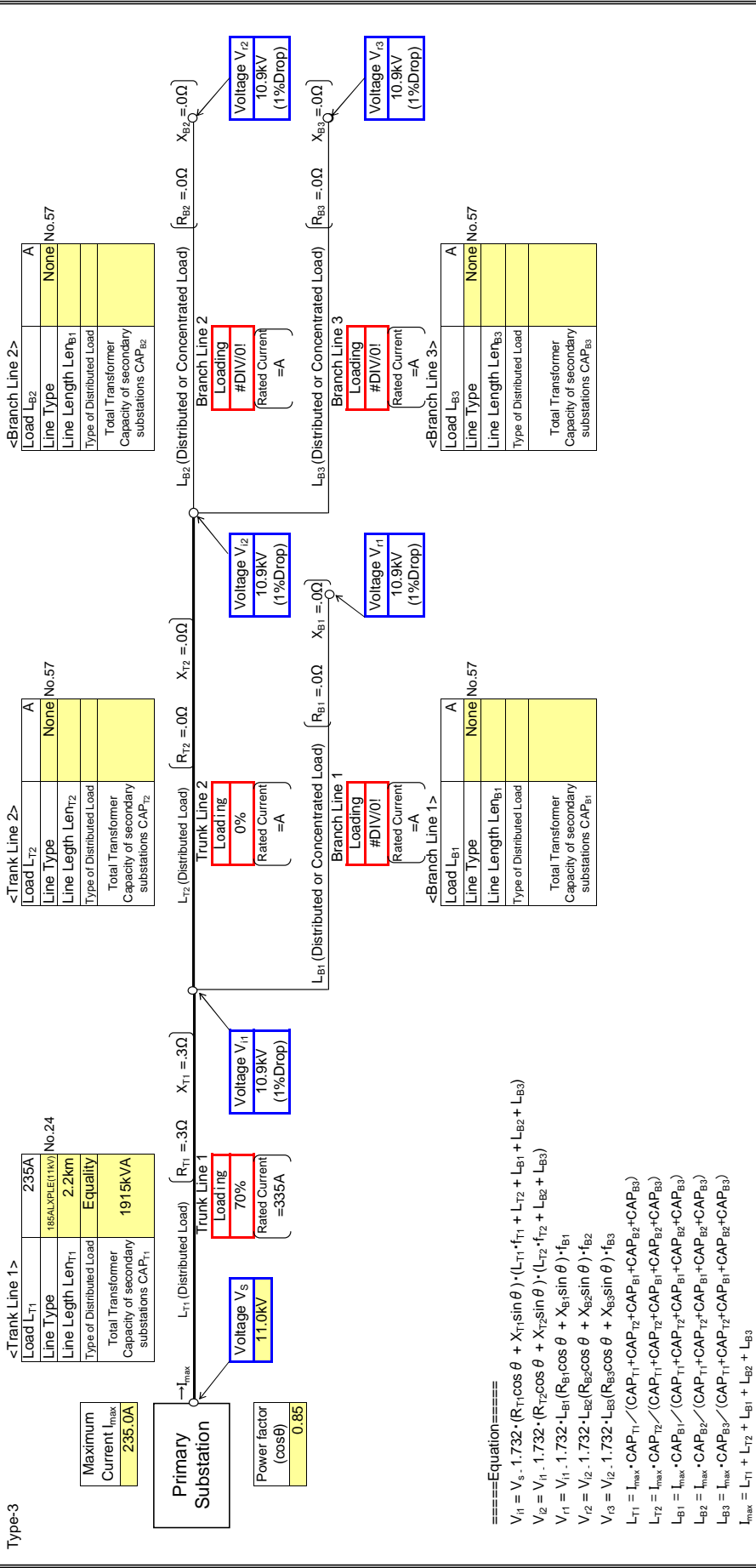
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

: Input data in colored cells



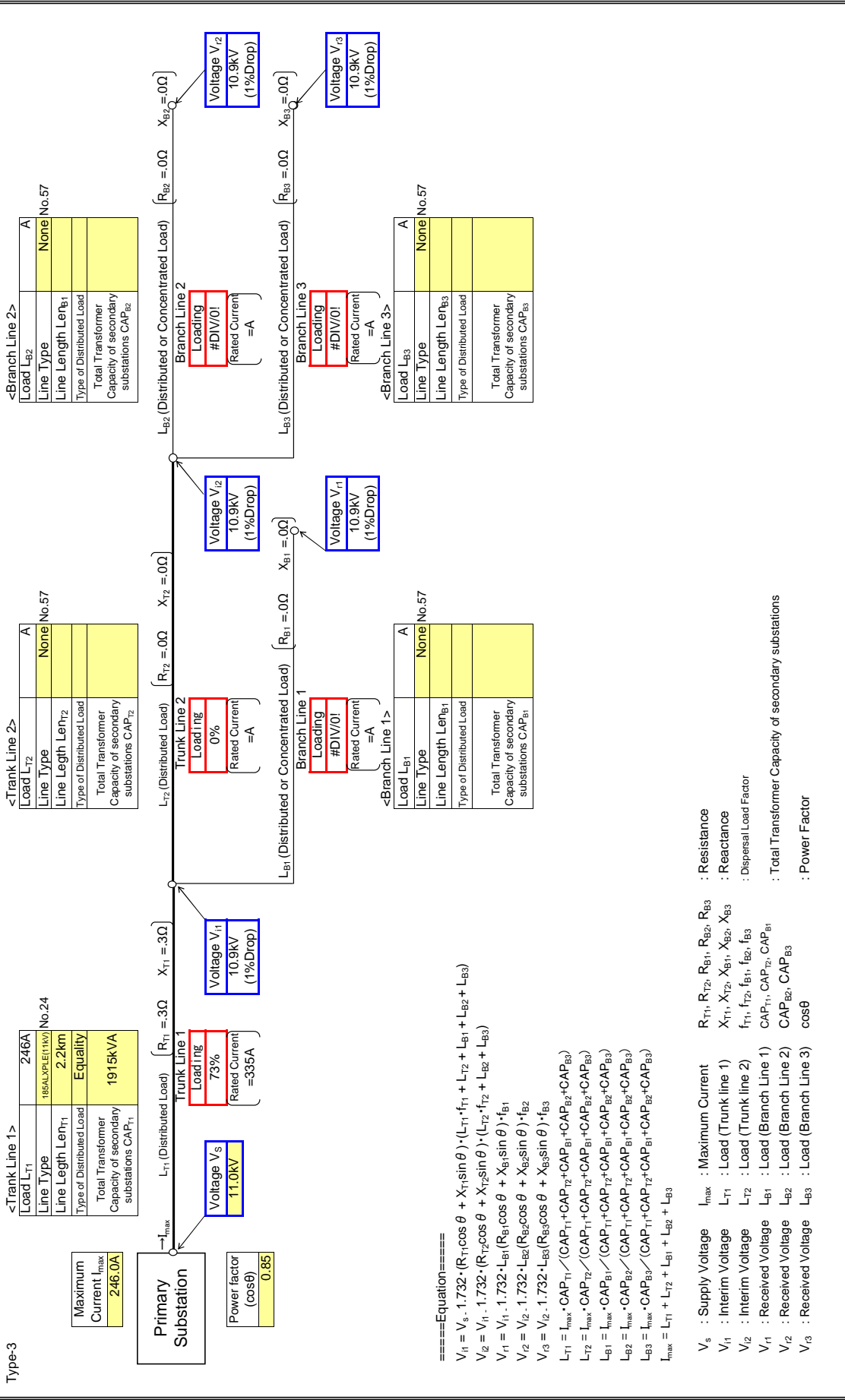
====Equation====
 $V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{i3} = V_{i2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{i4} = V_{i3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{i5} = V_{i4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- L_{T1}, L_{T2} : Load (Trunk line 1)
- L_{B1}, L_{B2}, L_{B3} : Load (Branch Line 1)
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

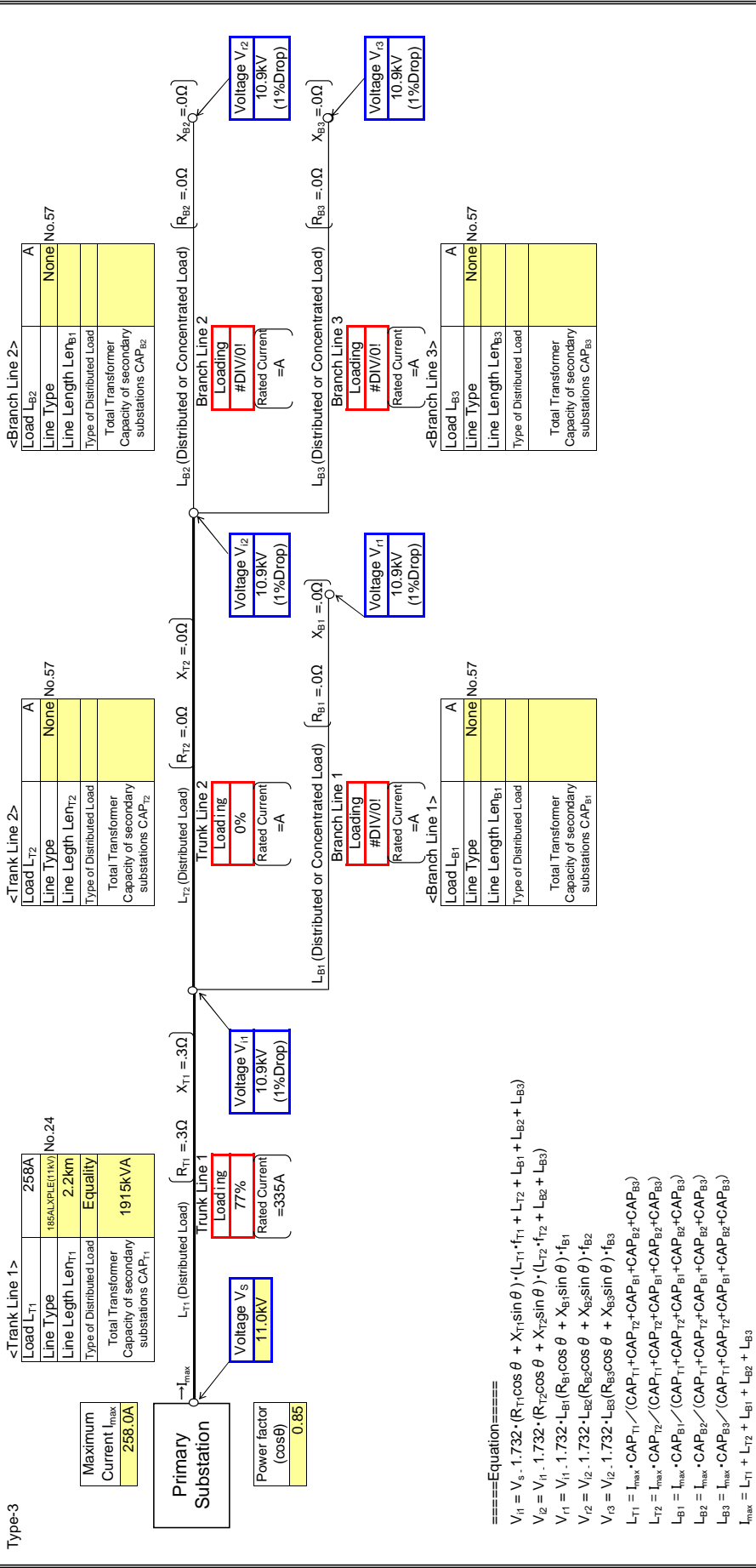
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

Input data in colored cells



====Equation====
 $V_{11} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{12} = V_{11} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{13} = V_{12} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{22} = V_{12} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{33} = V_{22} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

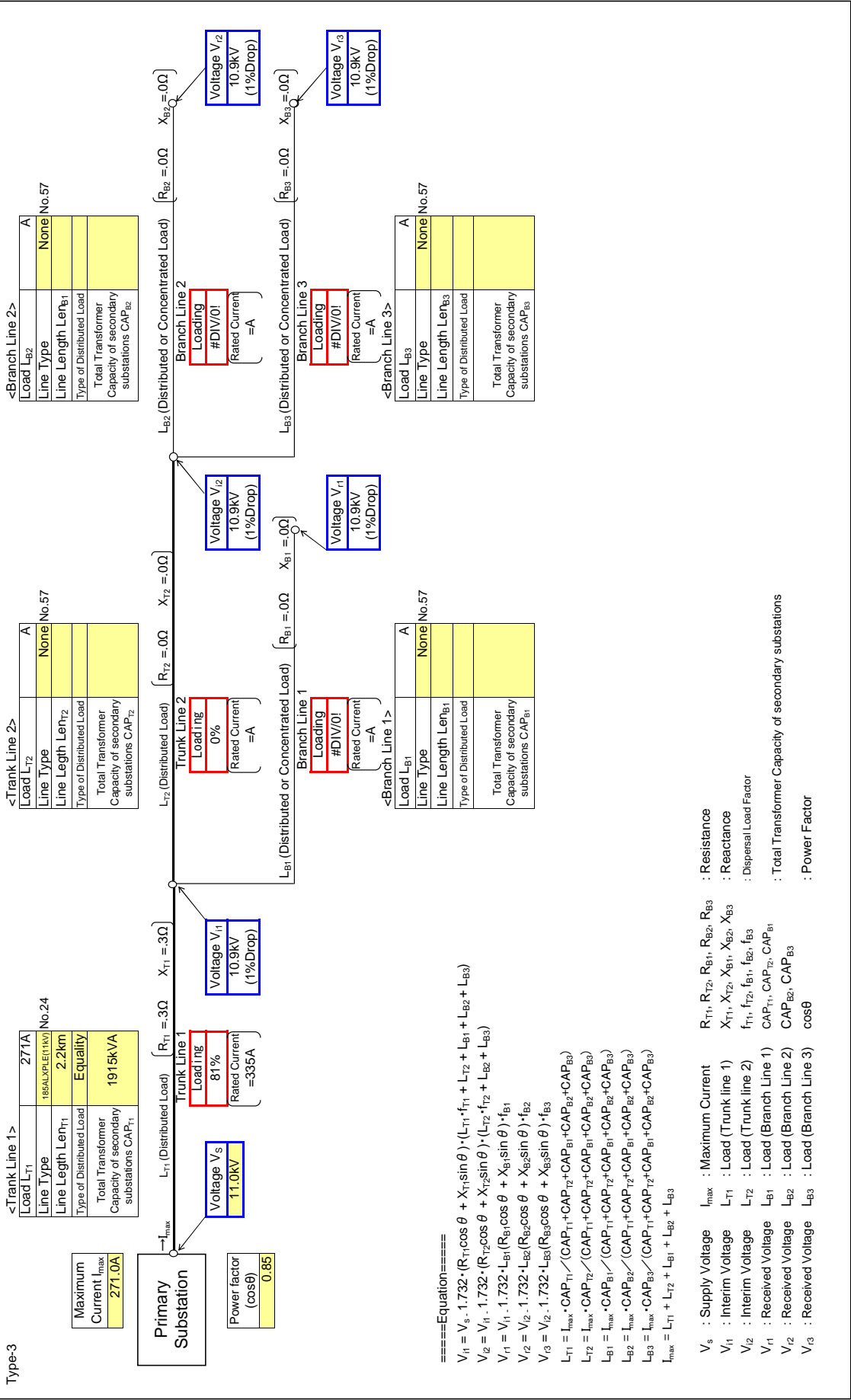
$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

- V_s : Supply Voltage
- V_{11} : Interim Voltage
- V_{12} : Interim Voltage
- V_{13} : Received Voltage
- V_{22} : Received Voltage
- V_{33} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G05

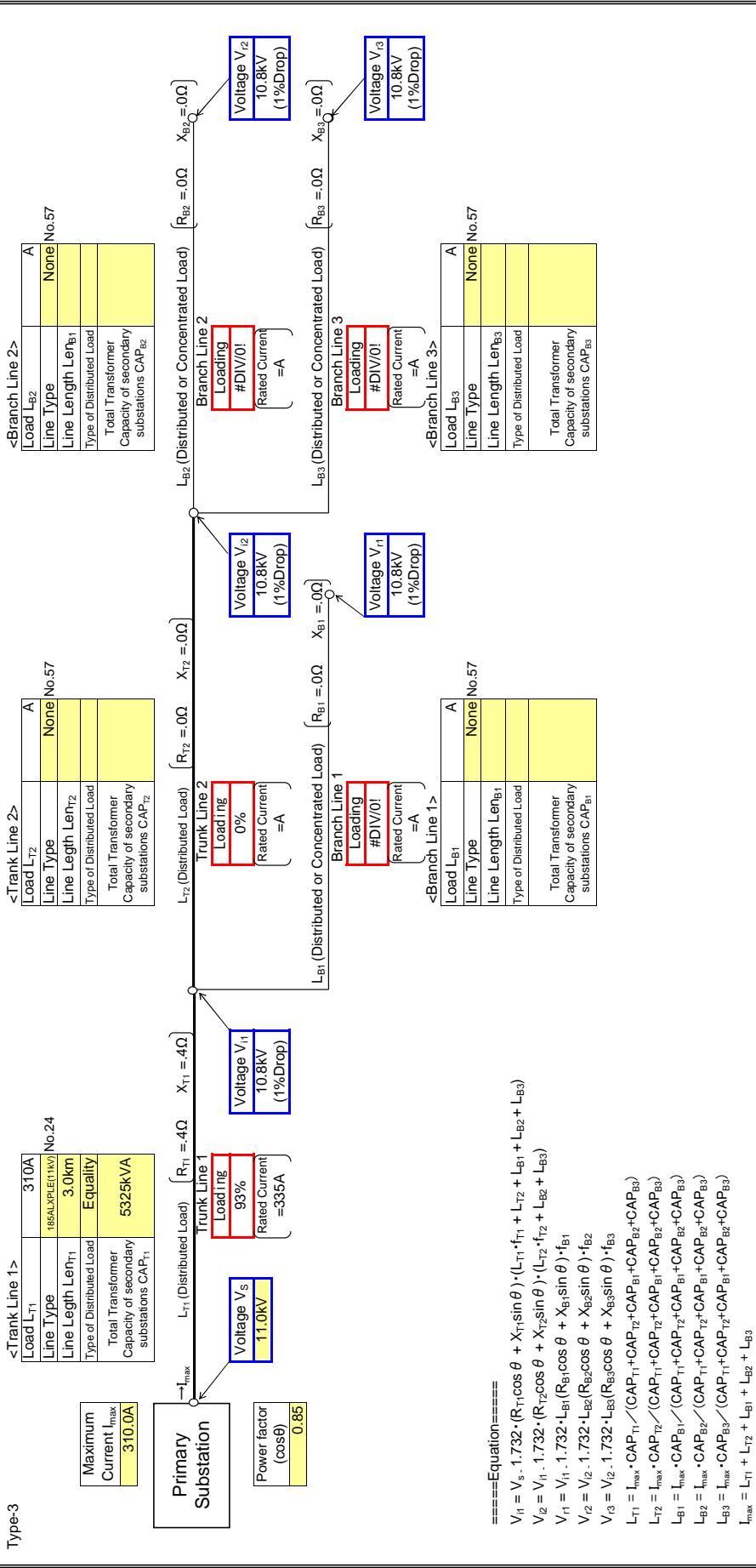
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

Input data in colored cells

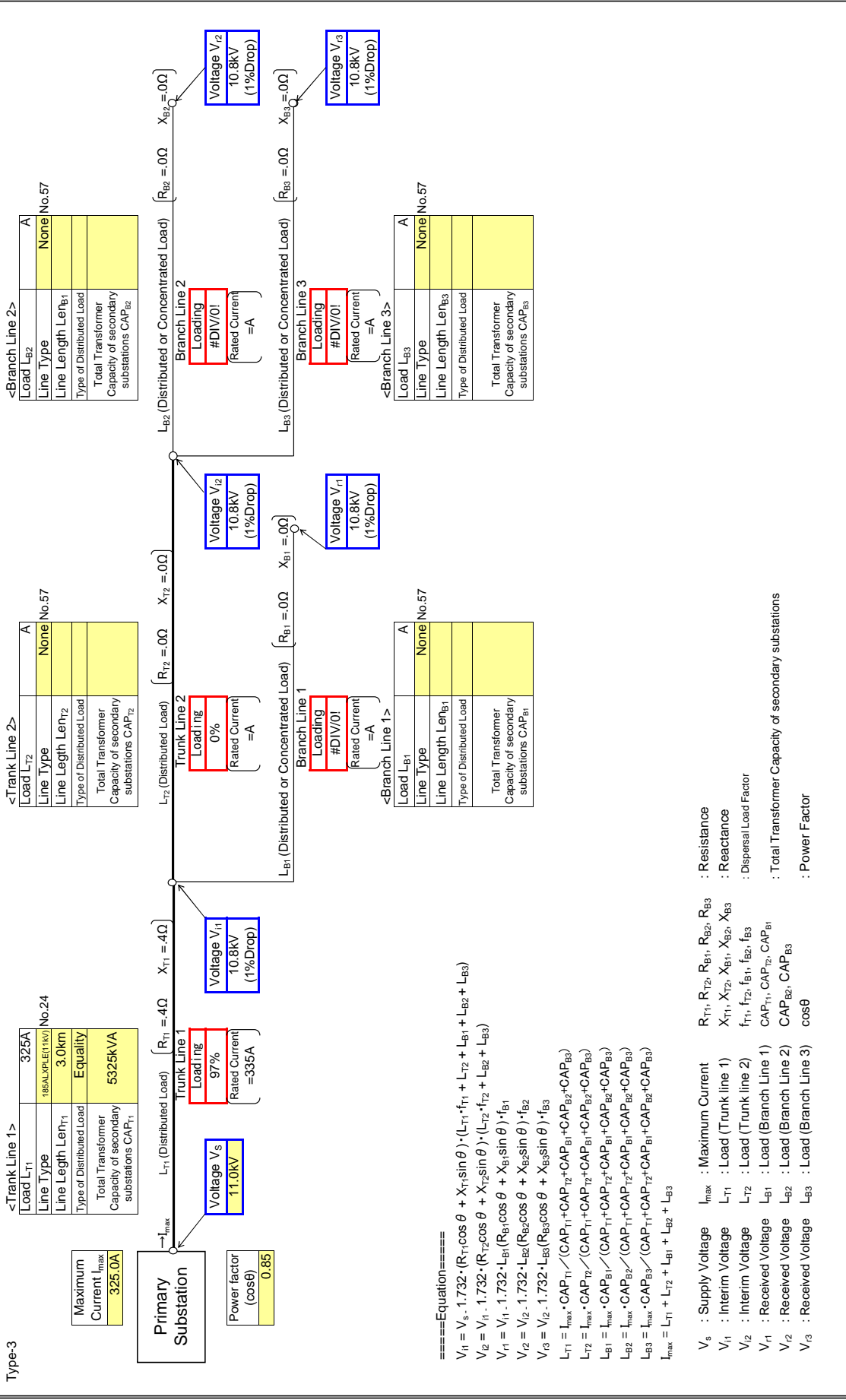


- ====Equation====
- $V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
- $V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
- $V_{r1} = V_{r1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
- $V_{r2} = V_{r2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
- $V_{r3} = V_{r2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$
- $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- V_{r1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- V_{r2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
- V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

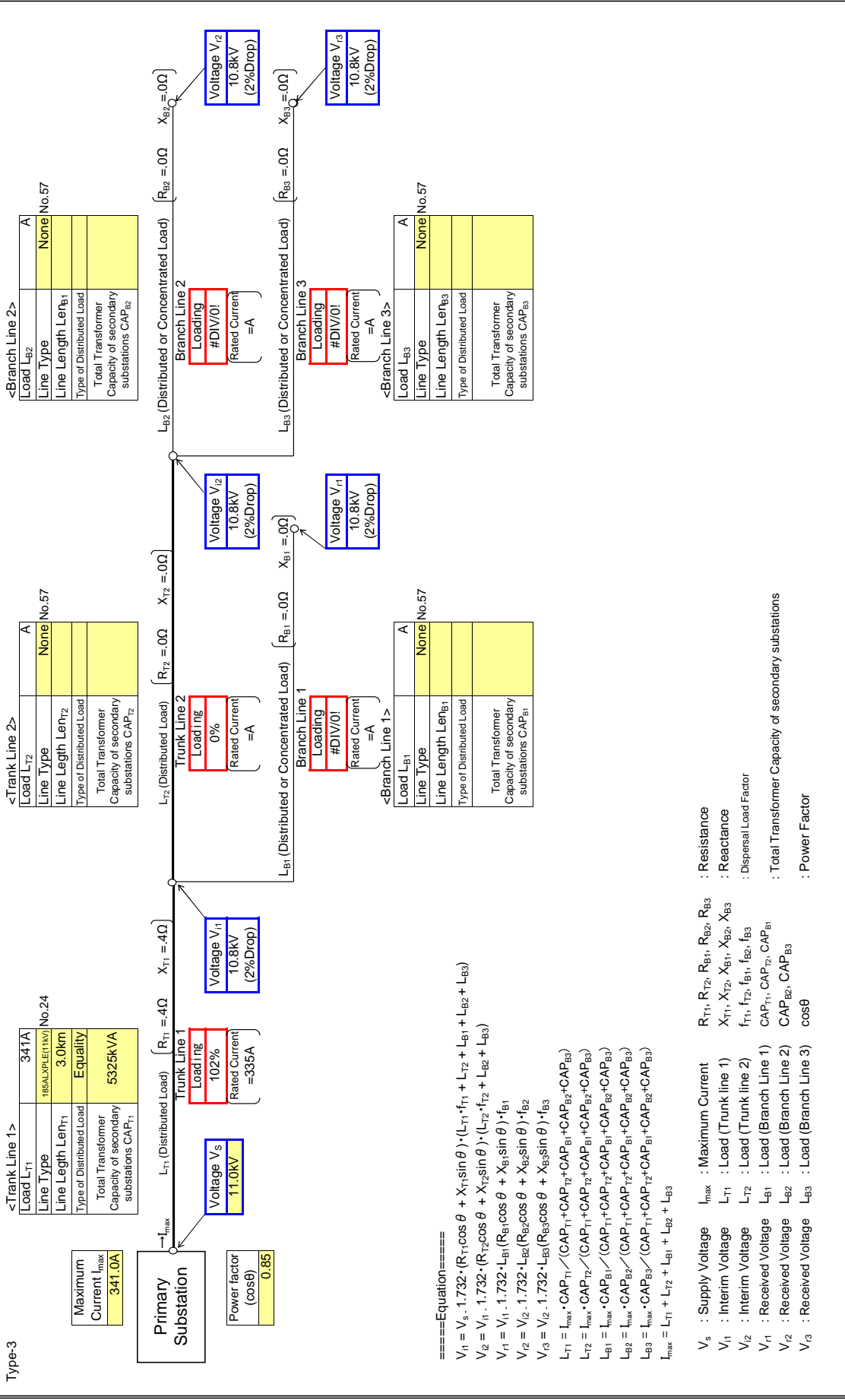
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

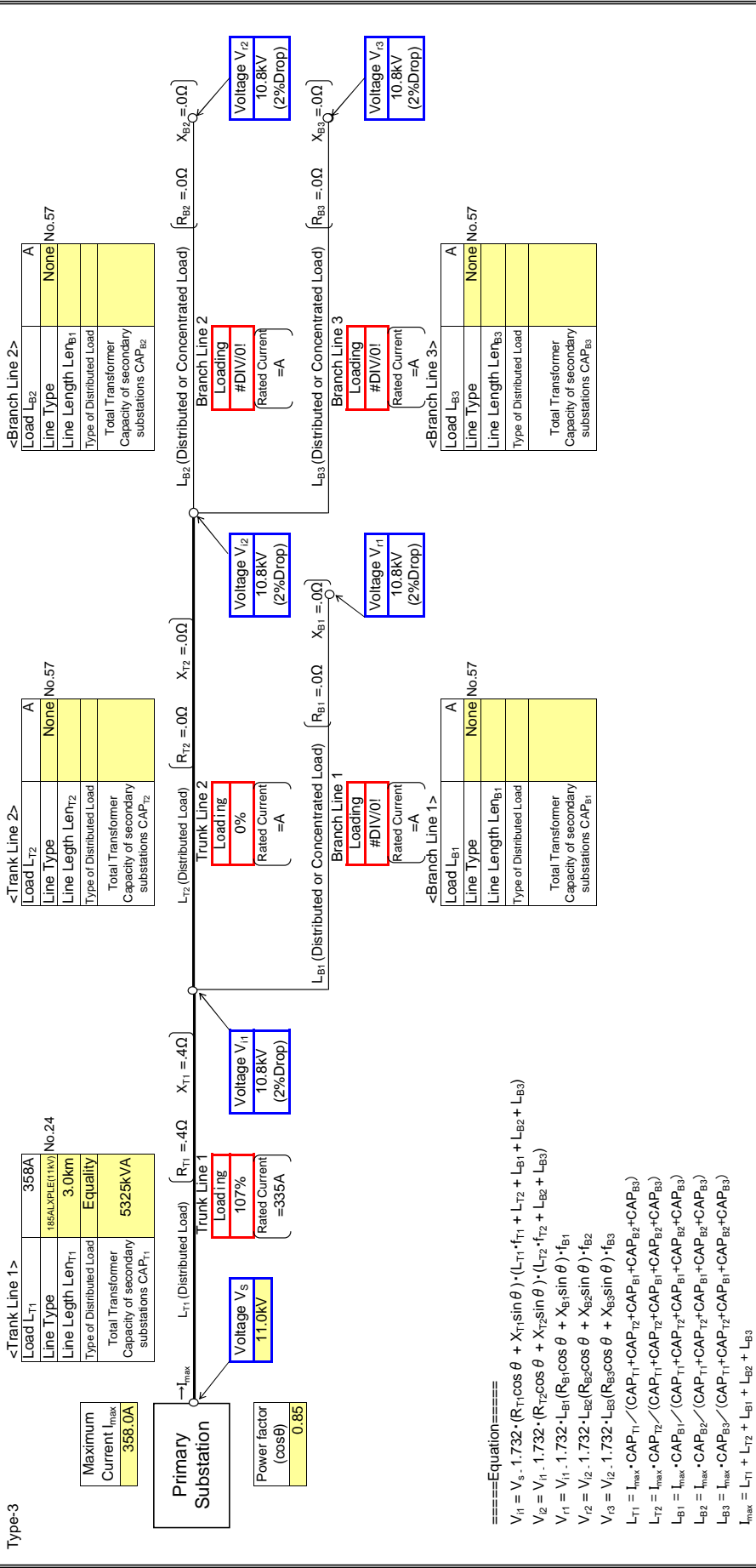
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

Input data in colored cells

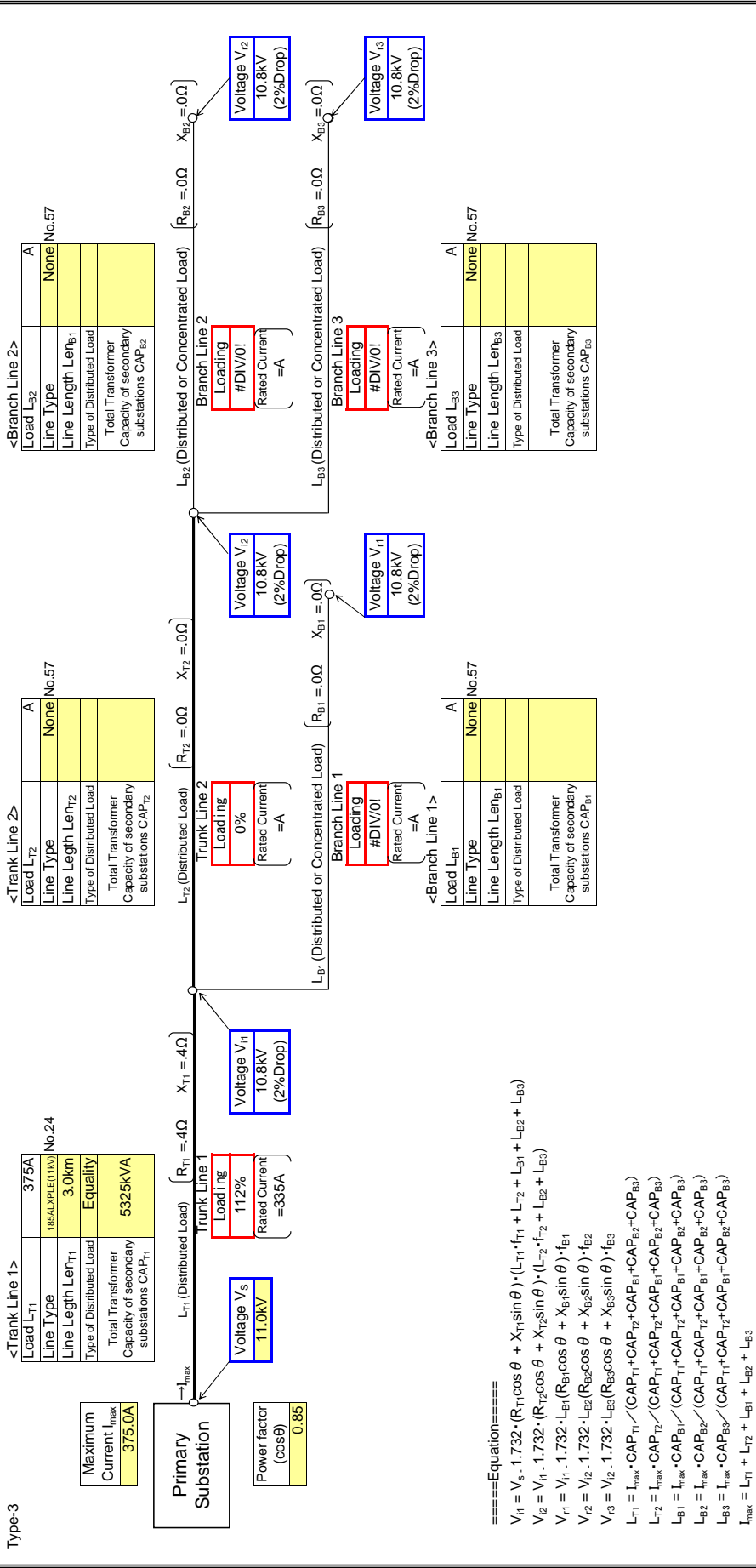


- ====Equation====
- $V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
- $V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
- $V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
- $V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
- $V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$
- $L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
- $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- V_{i1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- V_{i2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor
- V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

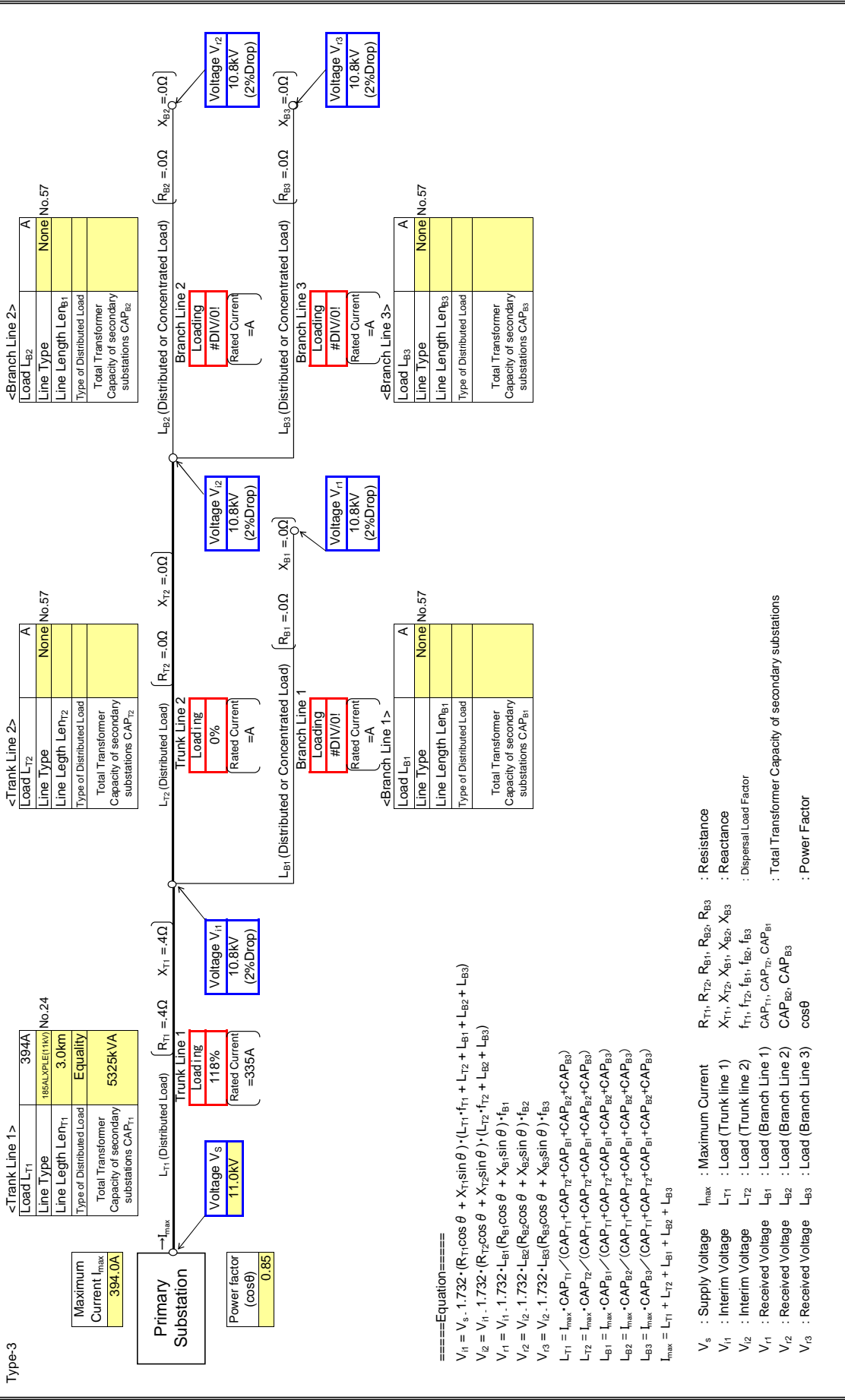
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

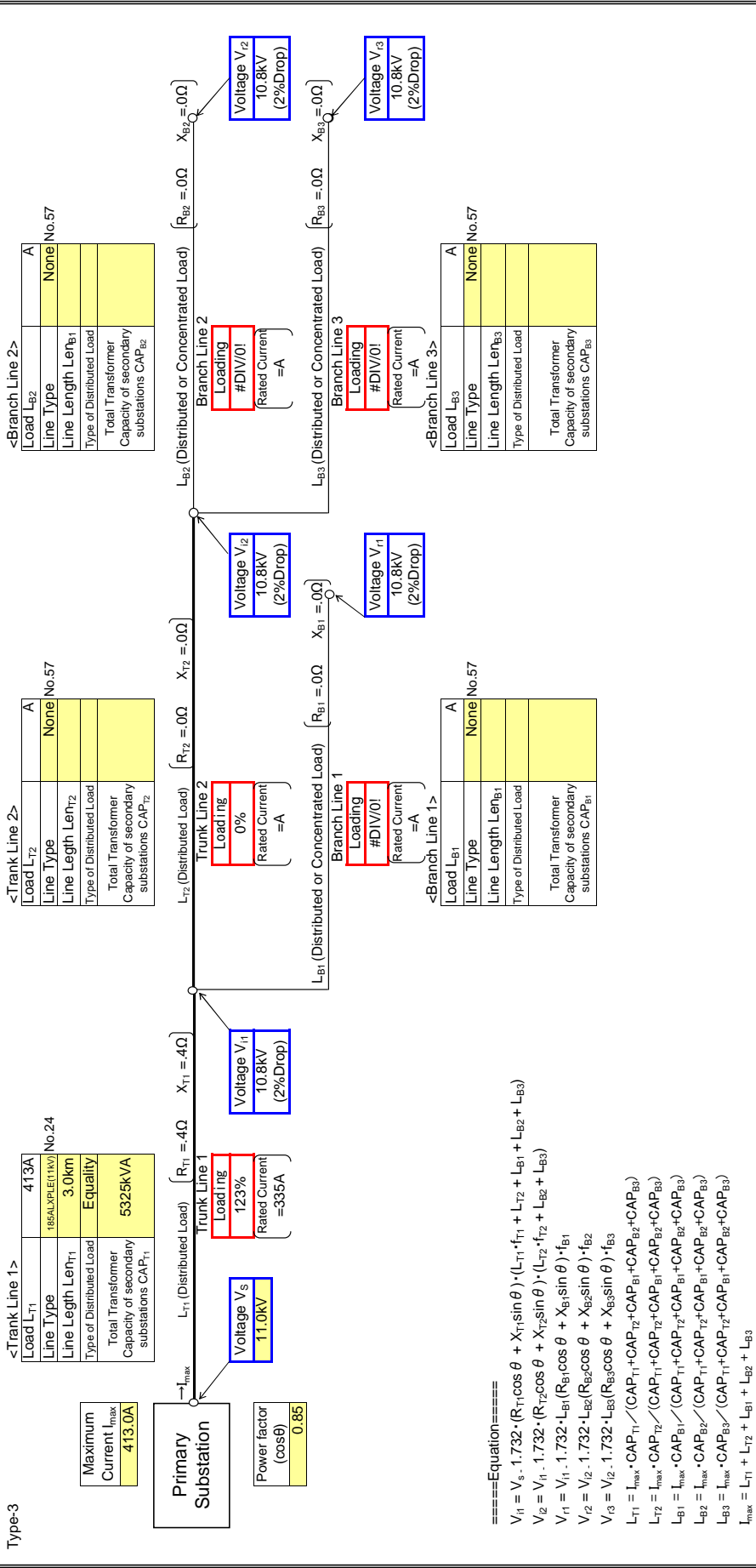
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

Input data in colored cells

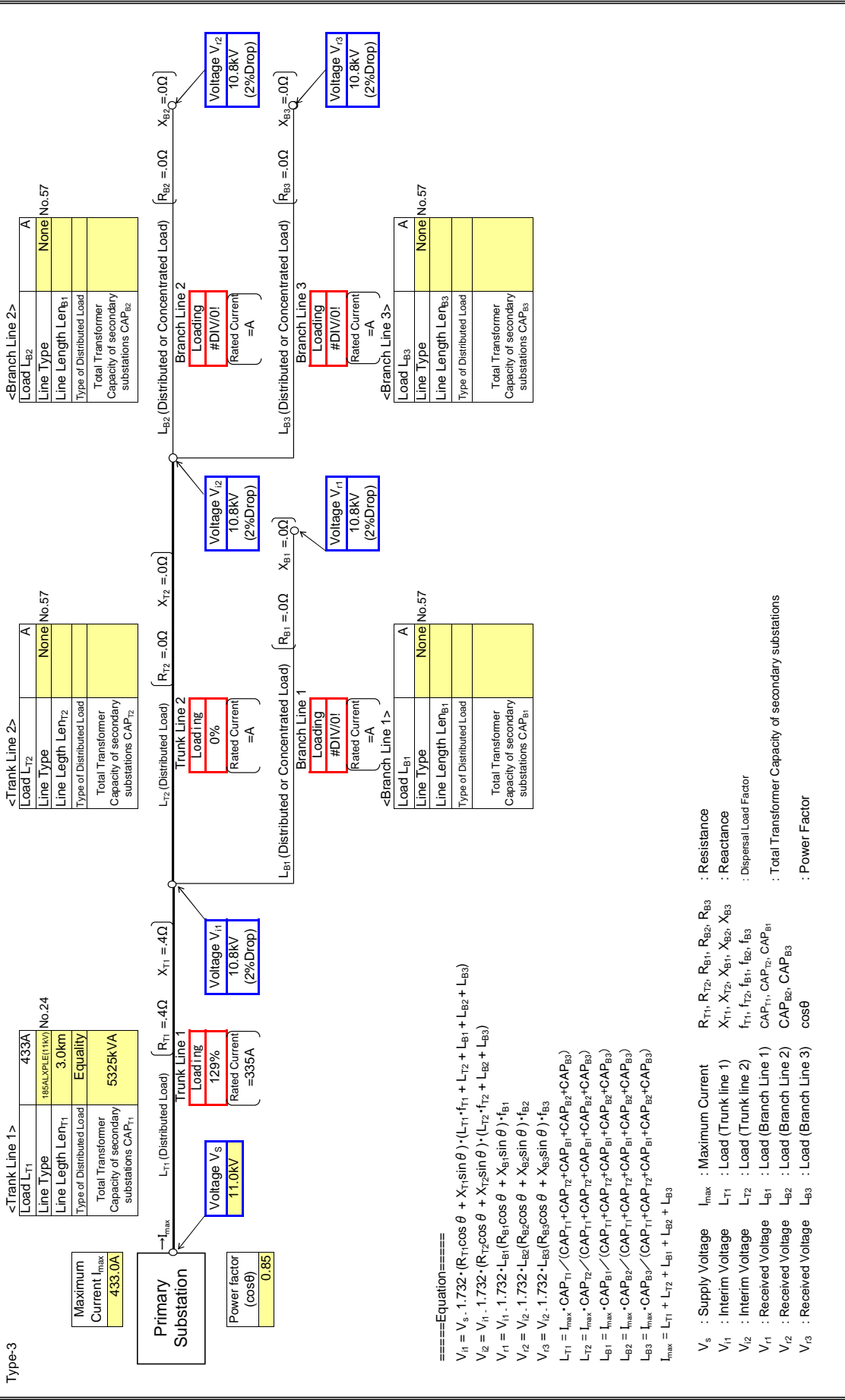


- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- CAP_{B2}, CAP_{B3} : Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

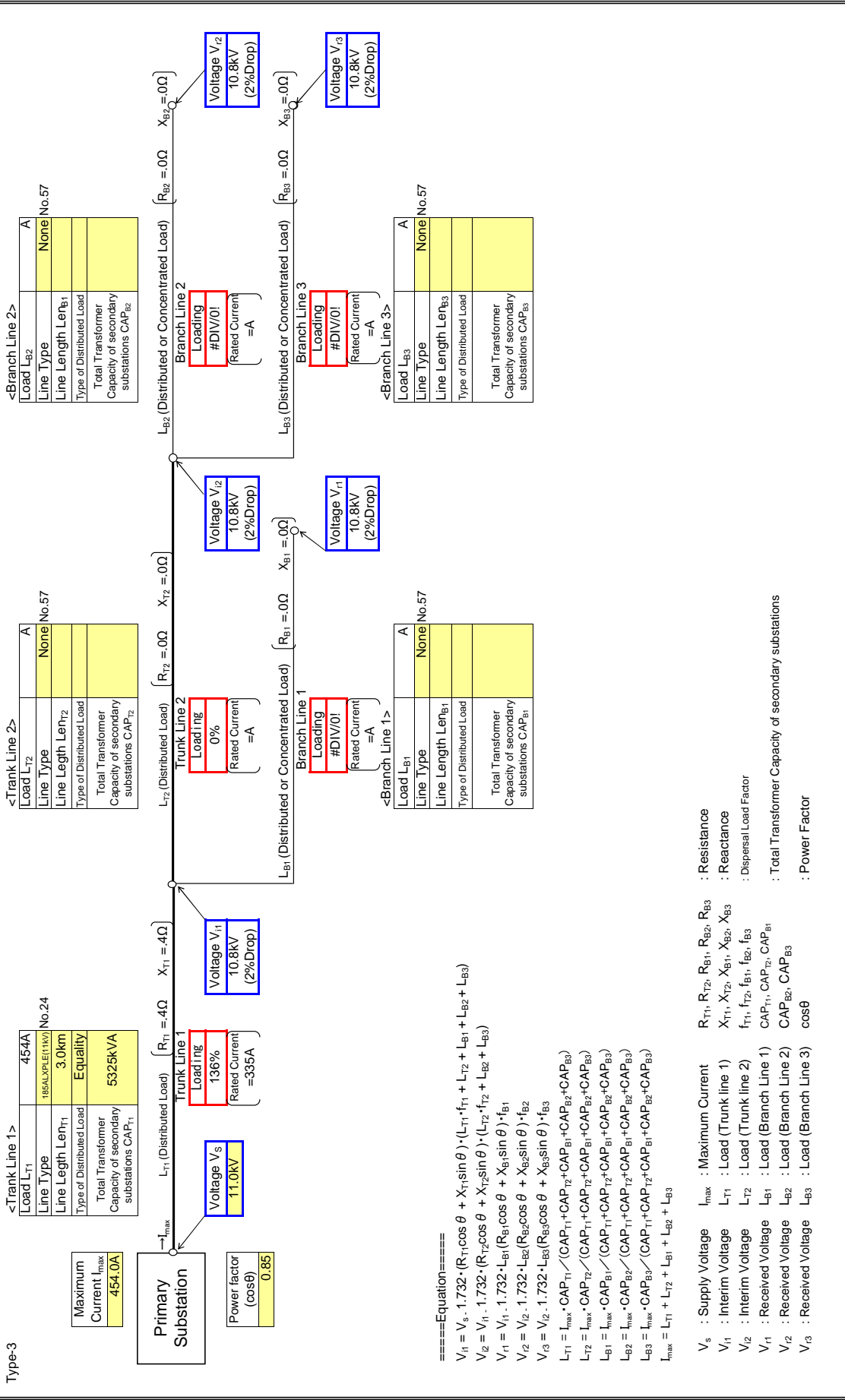
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

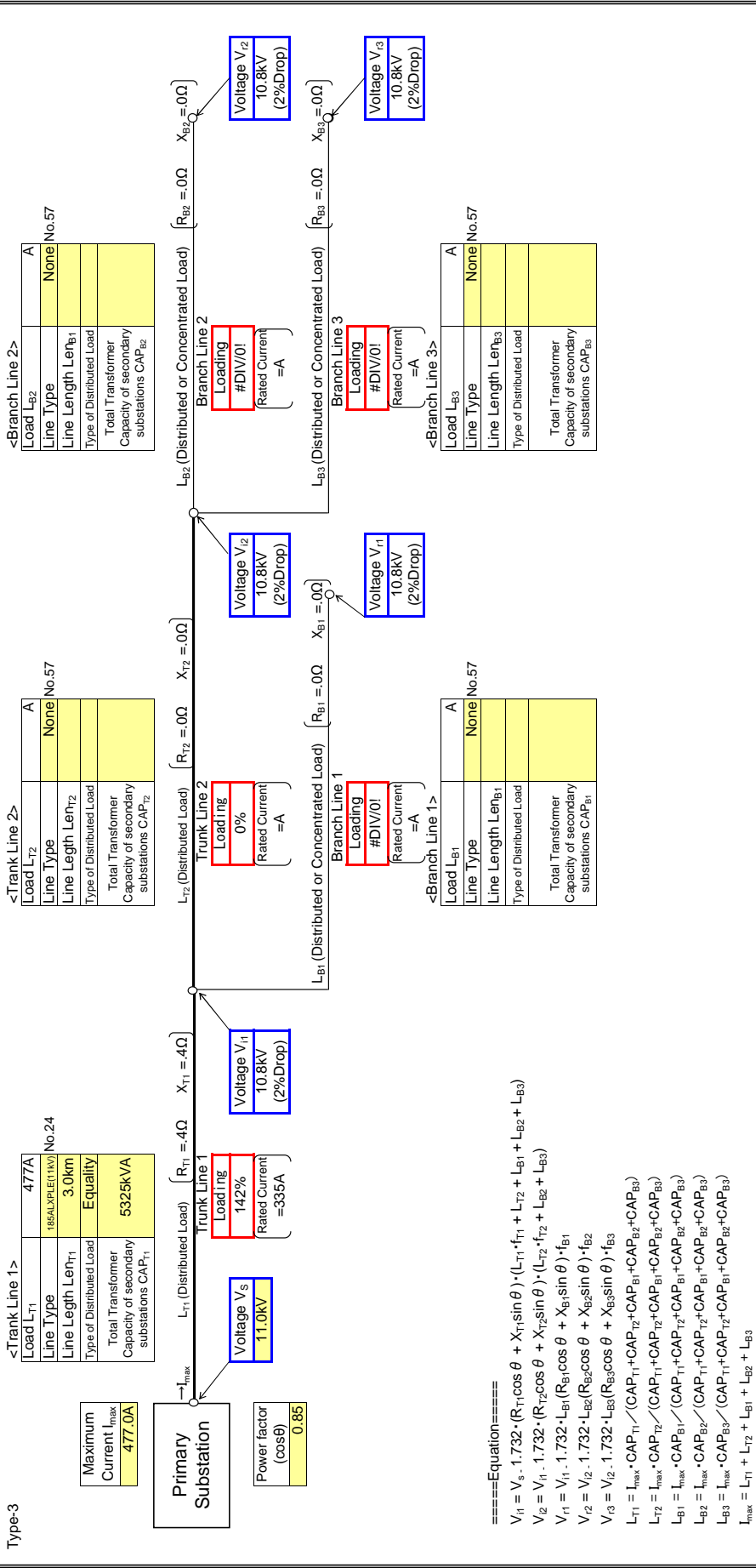
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

Type-3 : Input data in colored cells



- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- V_{i1}, V_{i2} : Interim Voltage
- L_{T1}, L_{T2} : Load (Trunk line 1), Load (Trunk line 2)
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1}, V_{r2} : Received Voltage
- L_{B1}, L_{B2}, L_{B3} : Load (Branch Line 1), Load (Branch Line 2), Load (Branch Line 3)
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos\theta$: Power Factor

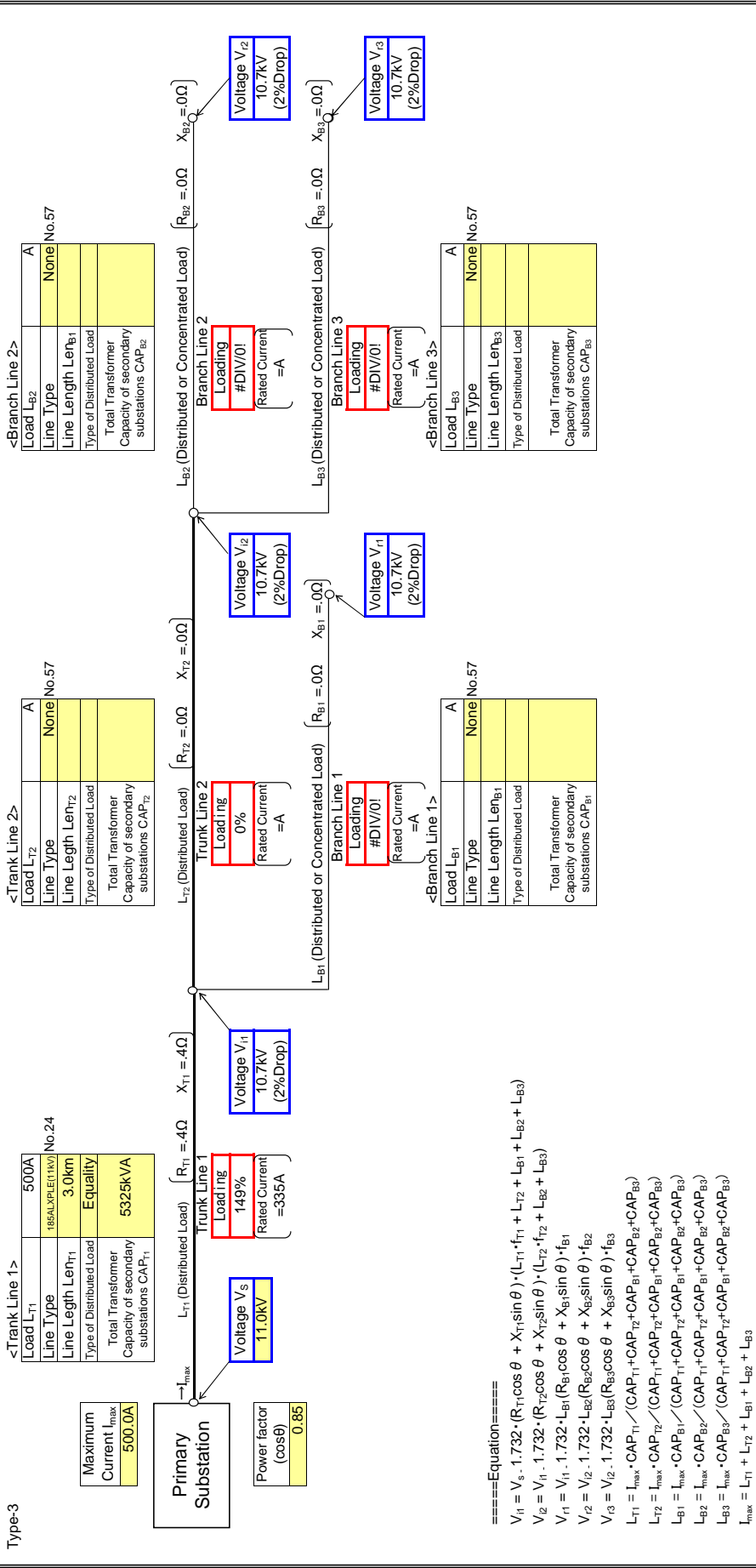
====Equation====
 $V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

: Input data in colored cells

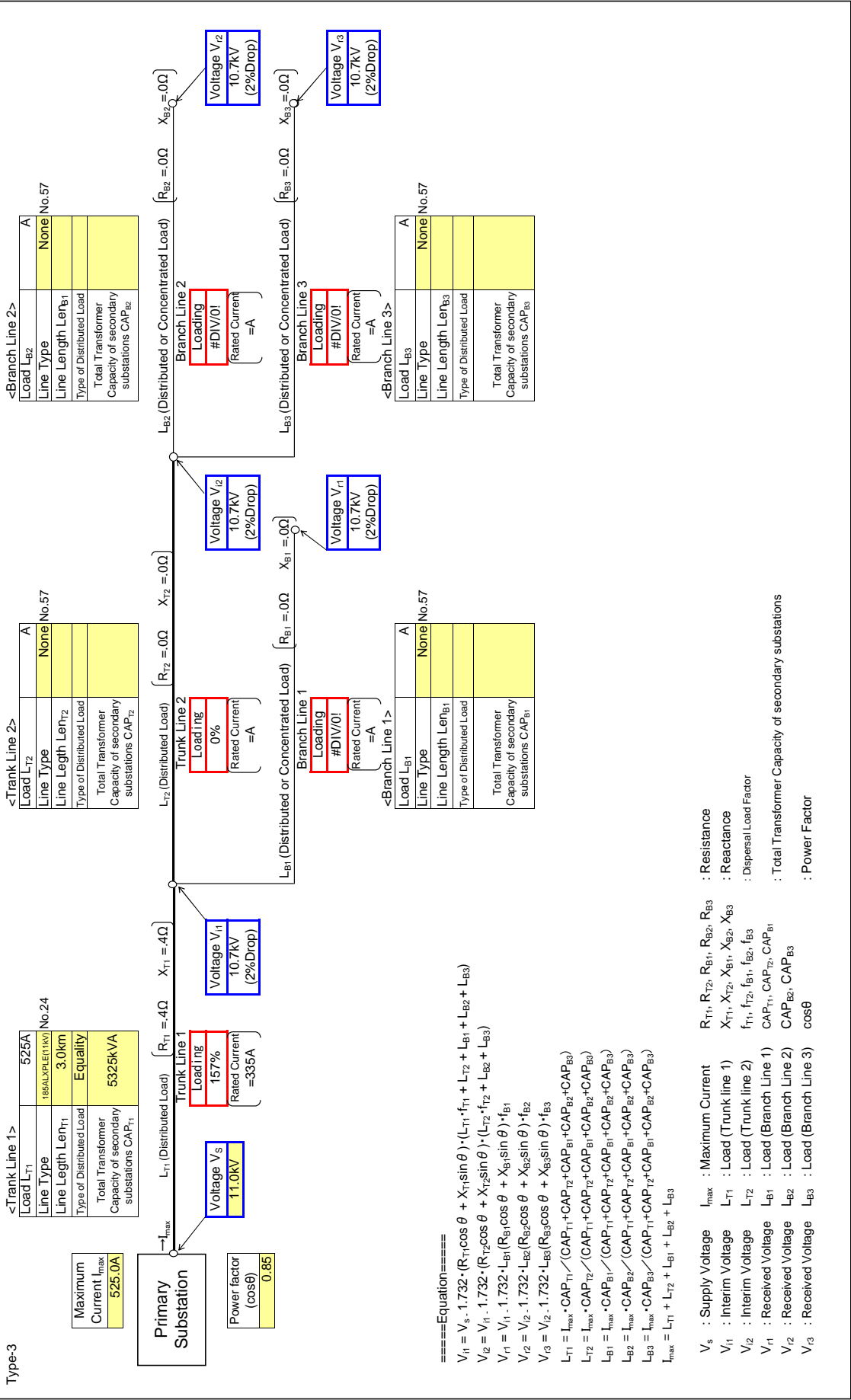


- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $L_{T1}, L_{T2}, L_{B1}, L_{B2}, L_{B3}$: Load (Trunk line 1), Load (Trunk line 2), Load (Branch Line 1), Load (Branch Line 2), Load (Branch Line 3)
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G25

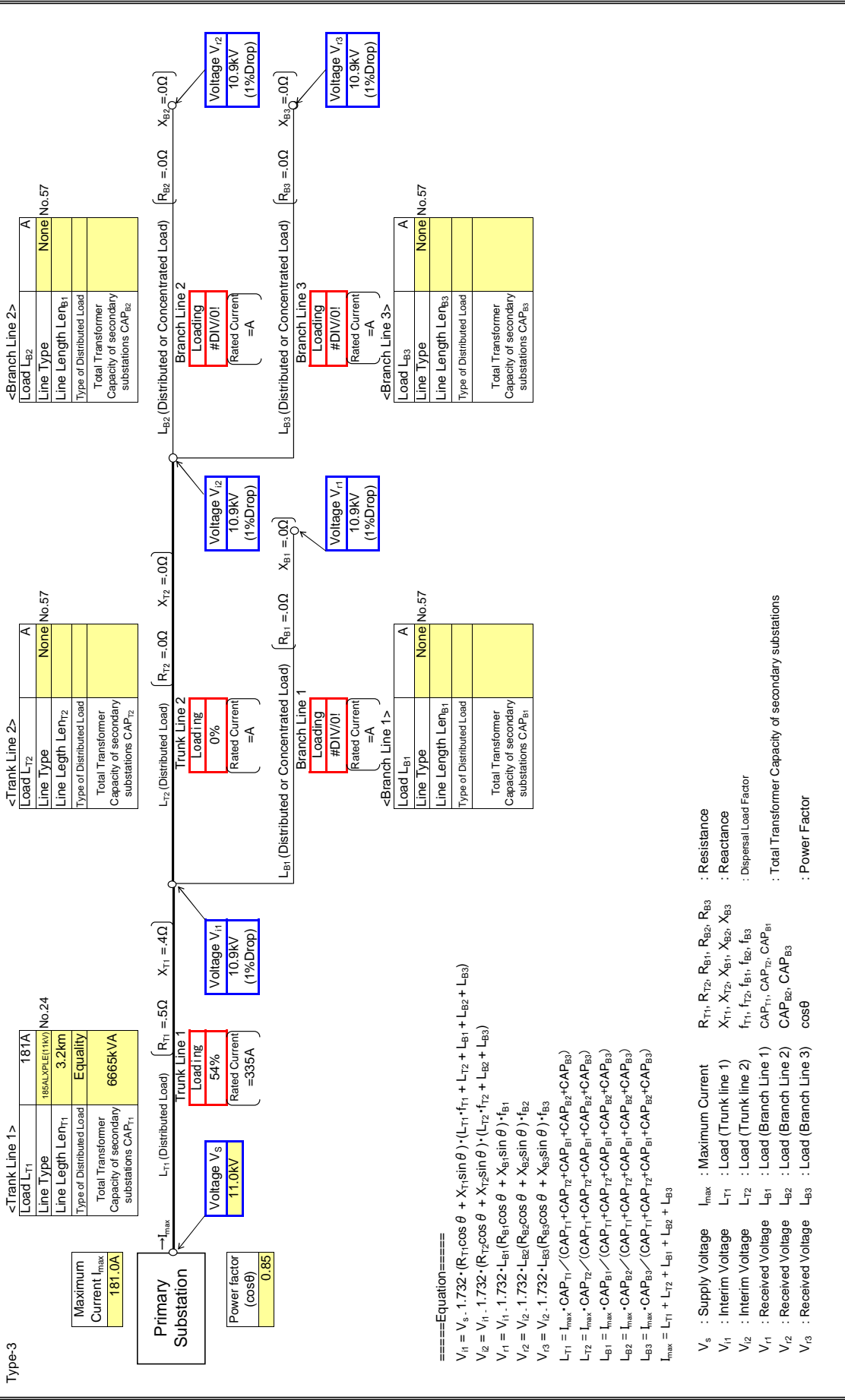
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

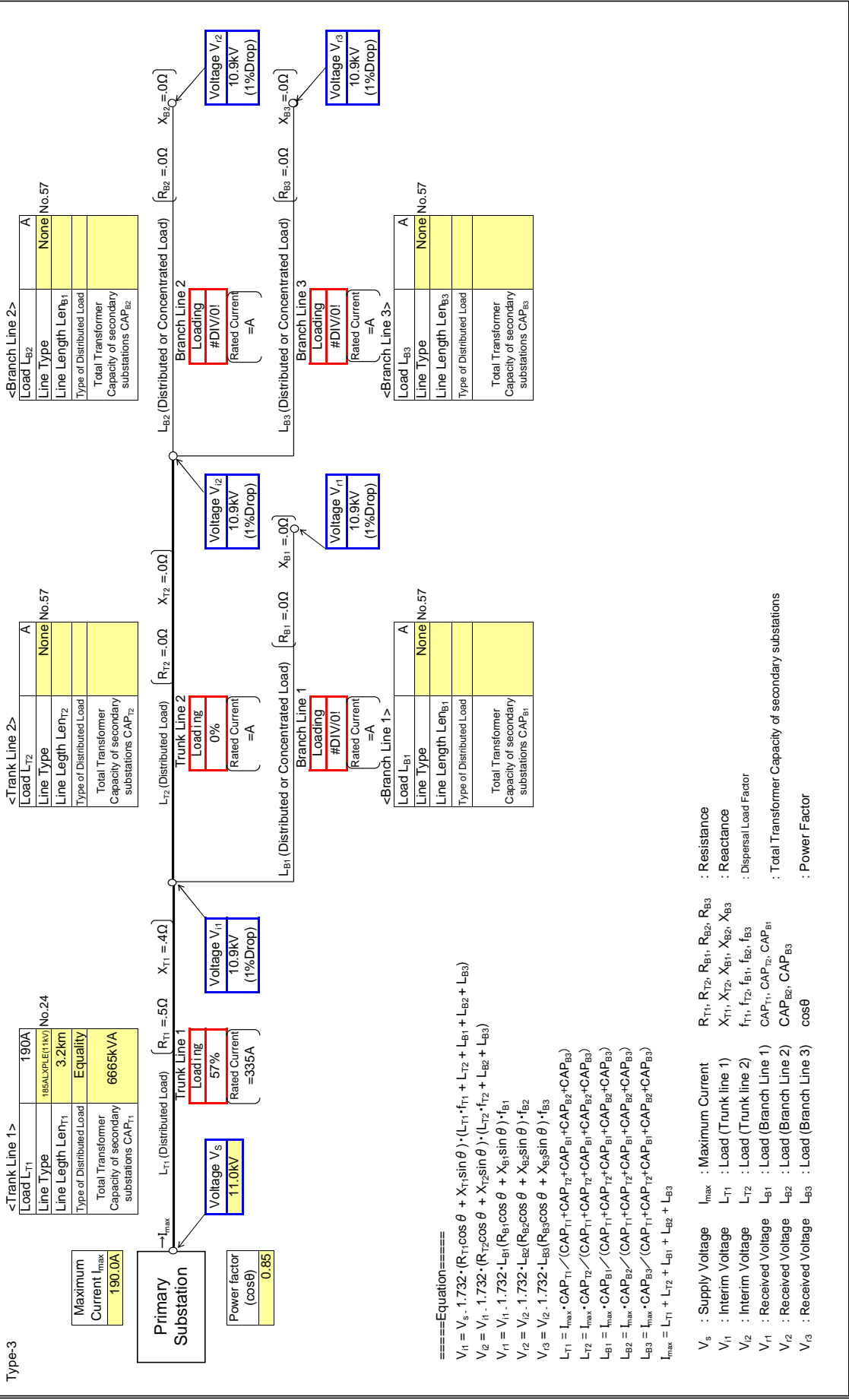
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

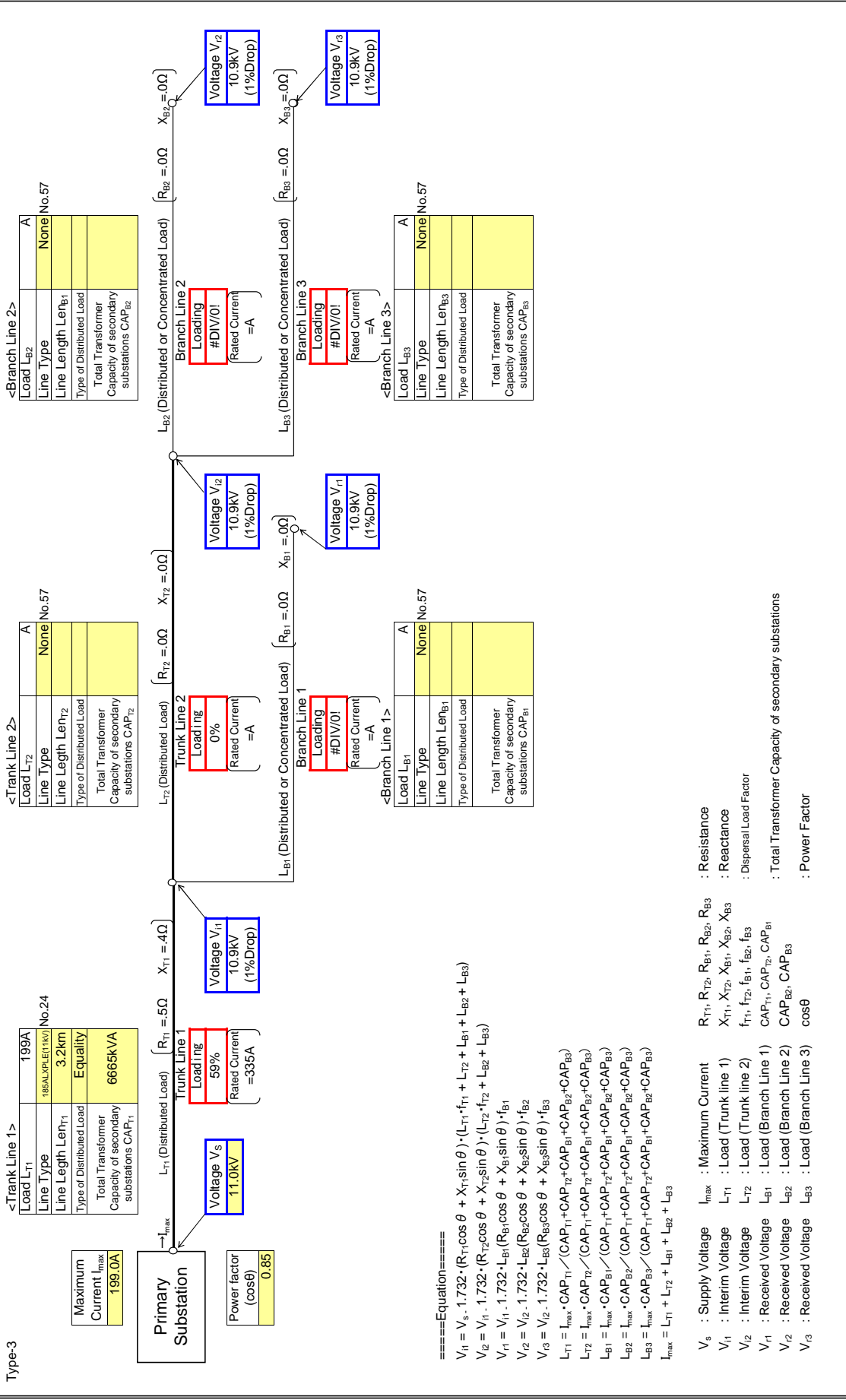
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

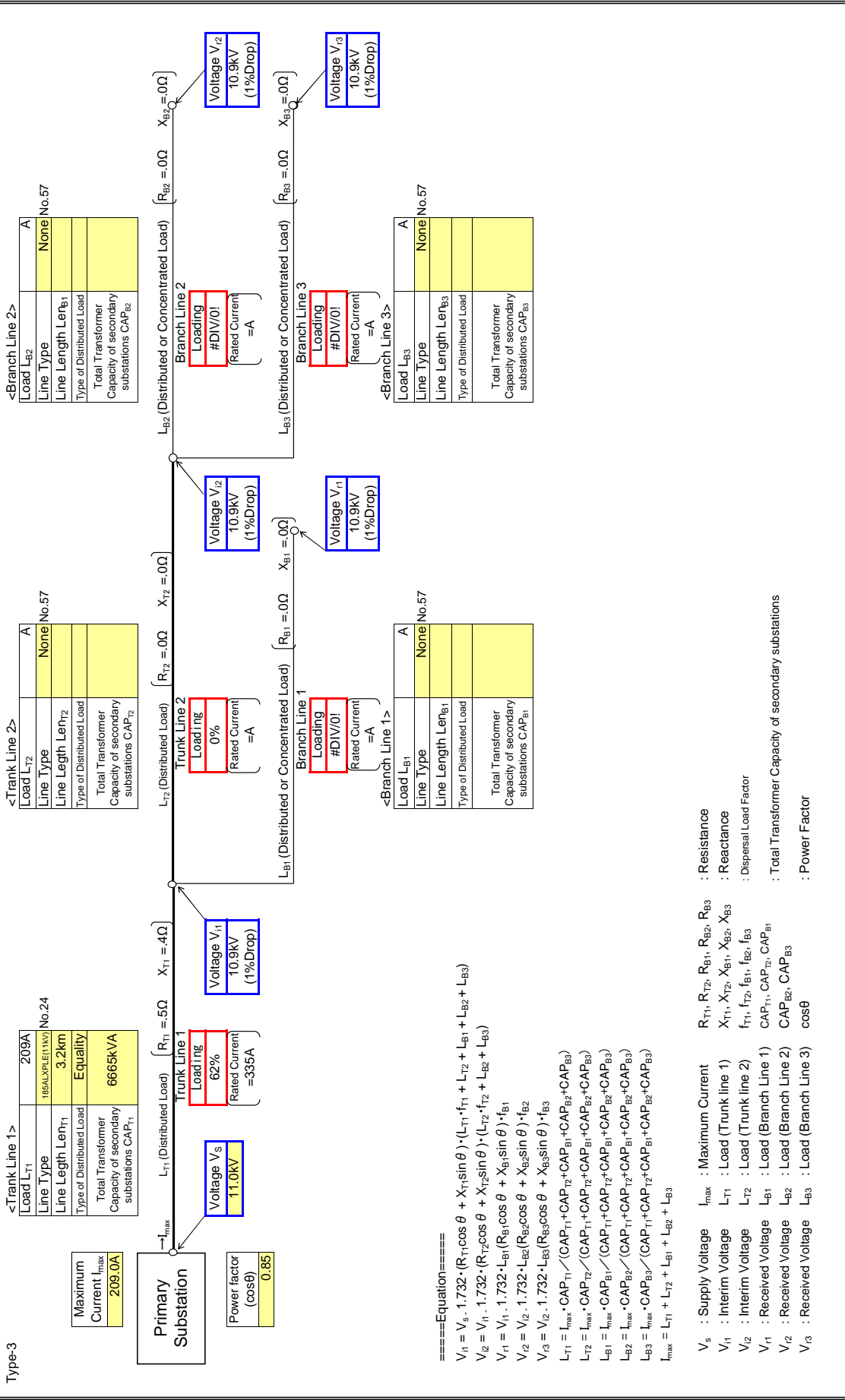
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

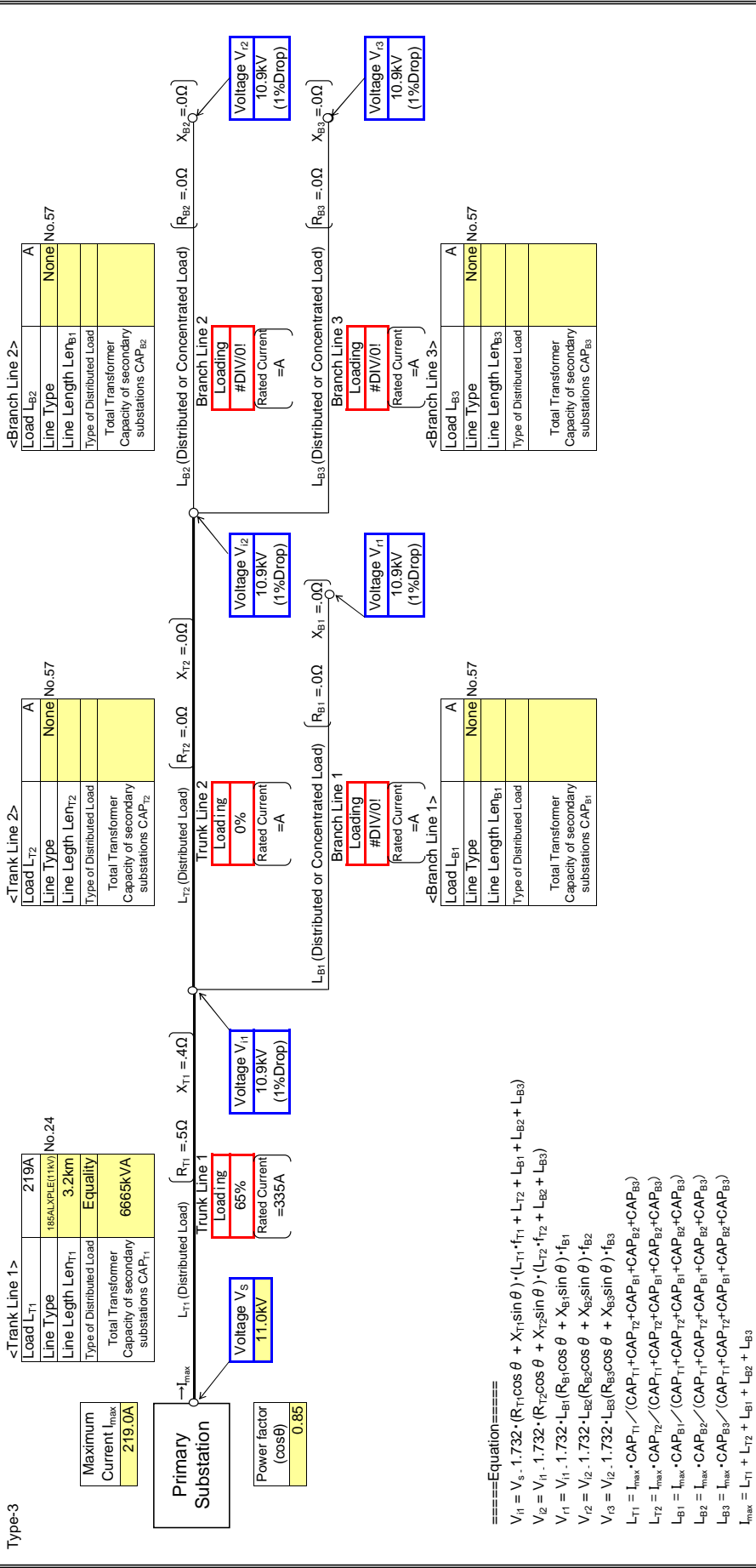
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

Type-3 : Input data in colored cells

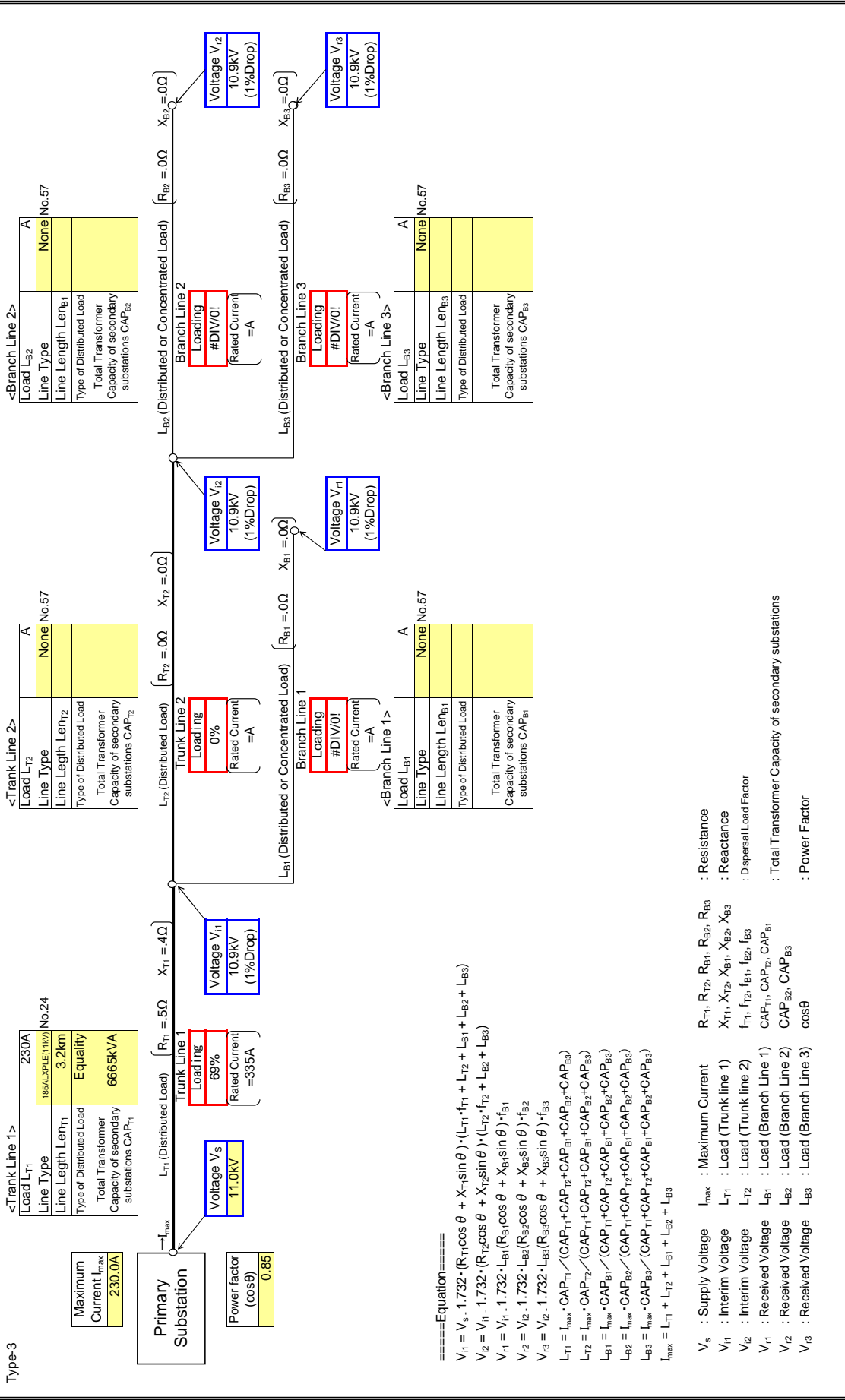


- ====Equation====
- $$V_{11} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$
- $$V_{12} = V_{11} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$
- $$V_{13} = V_{12} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$
- $$V_{22} = V_{12} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$
- $$V_{33} = V_{22} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$
- $$L_{T1} = L_{max} \cdot \text{CAP}_{T1} / (\text{CAP}_{T1} + \text{CAP}_{T2} + \text{CAP}_{B1} + \text{CAP}_{B2} + \text{CAP}_{B3})$$
- $$L_{T2} = L_{max} \cdot \text{CAP}_{T2} / (\text{CAP}_{T1} + \text{CAP}_{T2} + \text{CAP}_{B1} + \text{CAP}_{B2} + \text{CAP}_{B3})$$
- $$L_{B1} = L_{max} \cdot \text{CAP}_{B1} / (\text{CAP}_{T1} + \text{CAP}_{T2} + \text{CAP}_{B1} + \text{CAP}_{B2} + \text{CAP}_{B3})$$
- $$L_{B2} = L_{max} \cdot \text{CAP}_{B2} / (\text{CAP}_{T1} + \text{CAP}_{T2} + \text{CAP}_{B1} + \text{CAP}_{B2} + \text{CAP}_{B3})$$
- $$L_{B3} = L_{max} \cdot \text{CAP}_{B3} / (\text{CAP}_{T1} + \text{CAP}_{T2} + \text{CAP}_{B1} + \text{CAP}_{B2} + \text{CAP}_{B3})$$
- $$L_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$
- V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
 V_{11} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
 V_{12} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
 V_{13} : Received Voltage L_{B1} : Load (Branch Line 1) $\text{CAP}_{T1}, \text{CAP}_{T2}, \text{CAP}_{B1}$: Total Transformer Capacity of secondary substations
 V_{22} : Received Voltage L_{B2} : Load (Branch Line 2) $\text{CAP}_{B2}, \text{CAP}_{B3}$: Power Factor
 V_{33} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

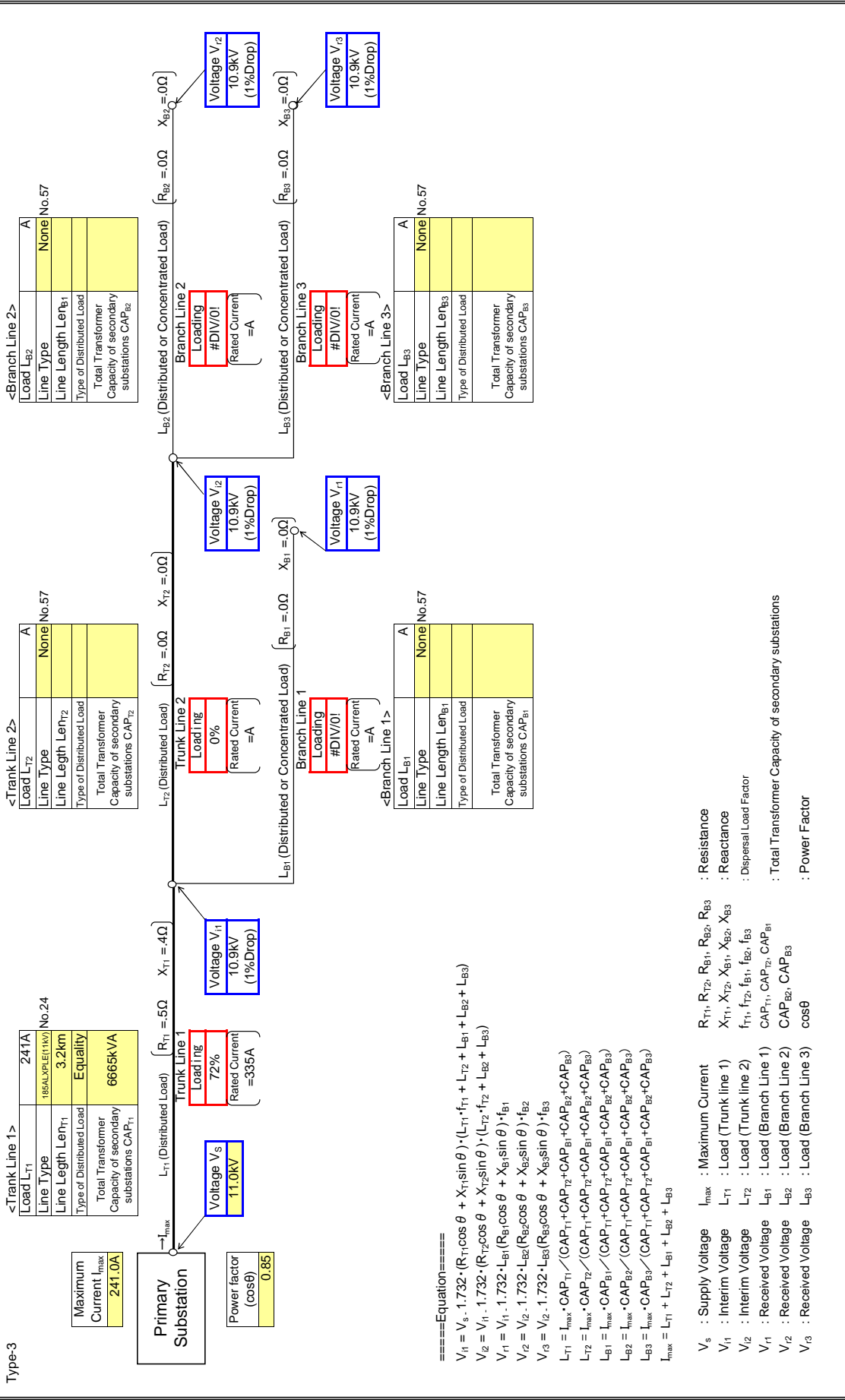
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

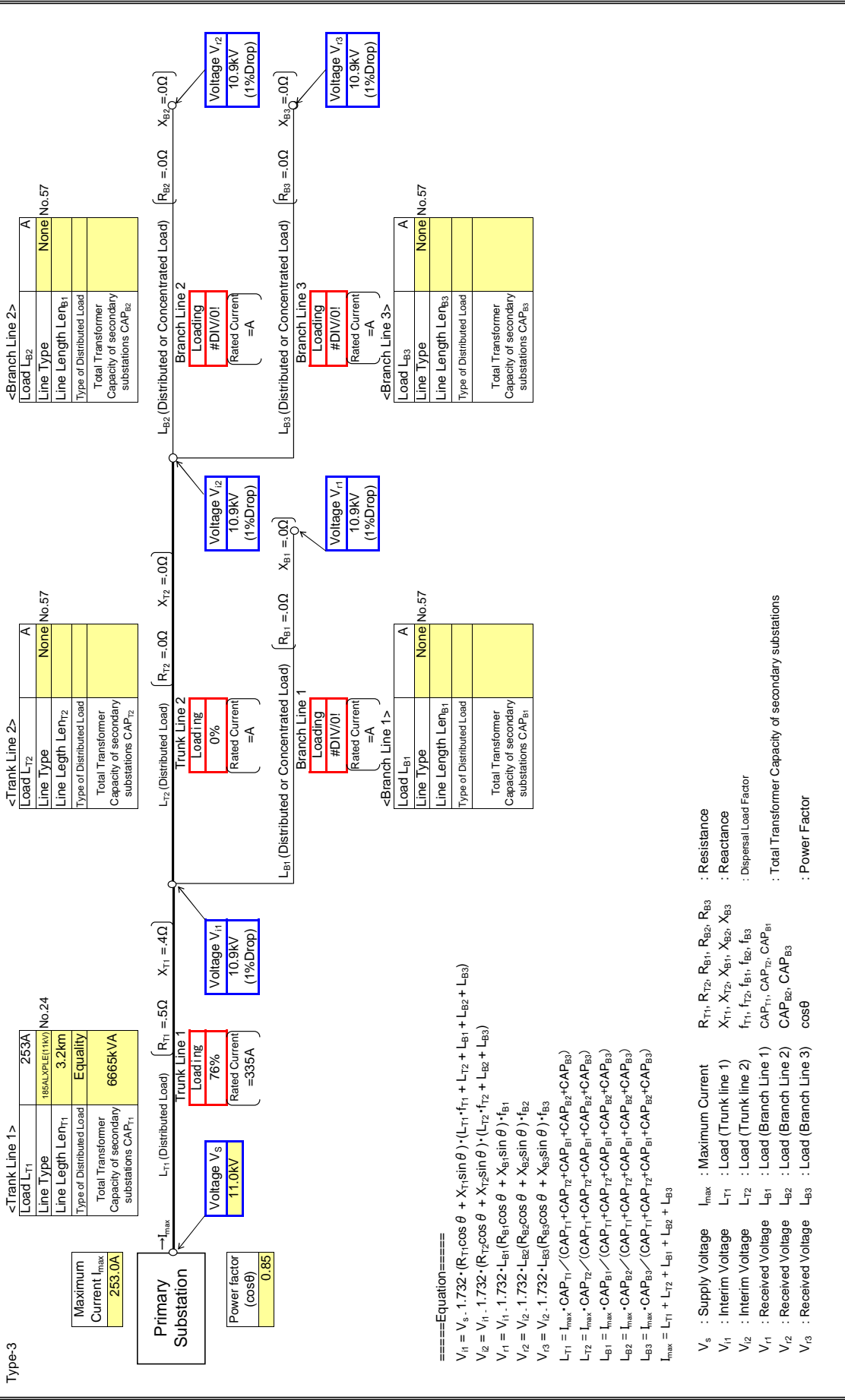
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

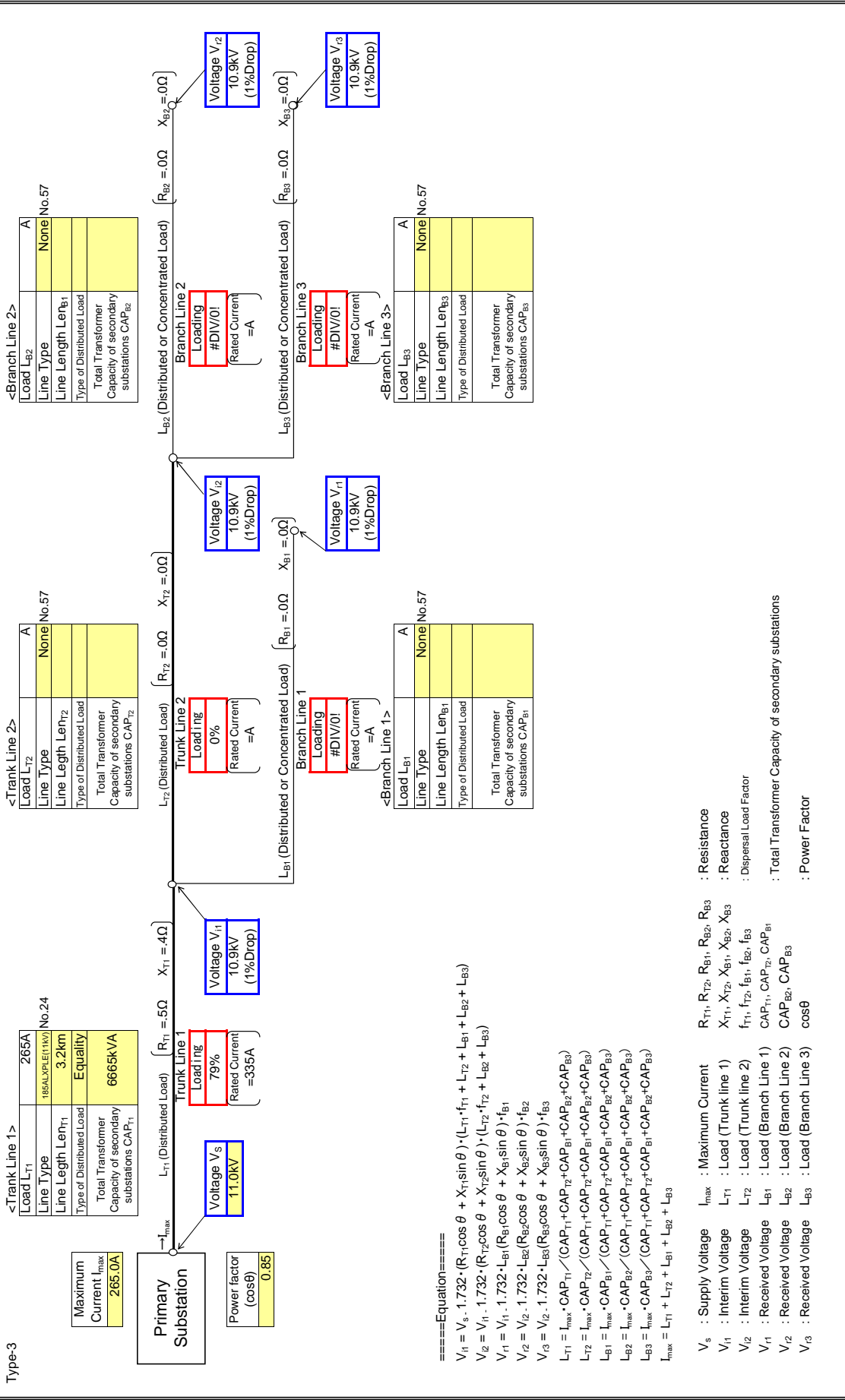
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

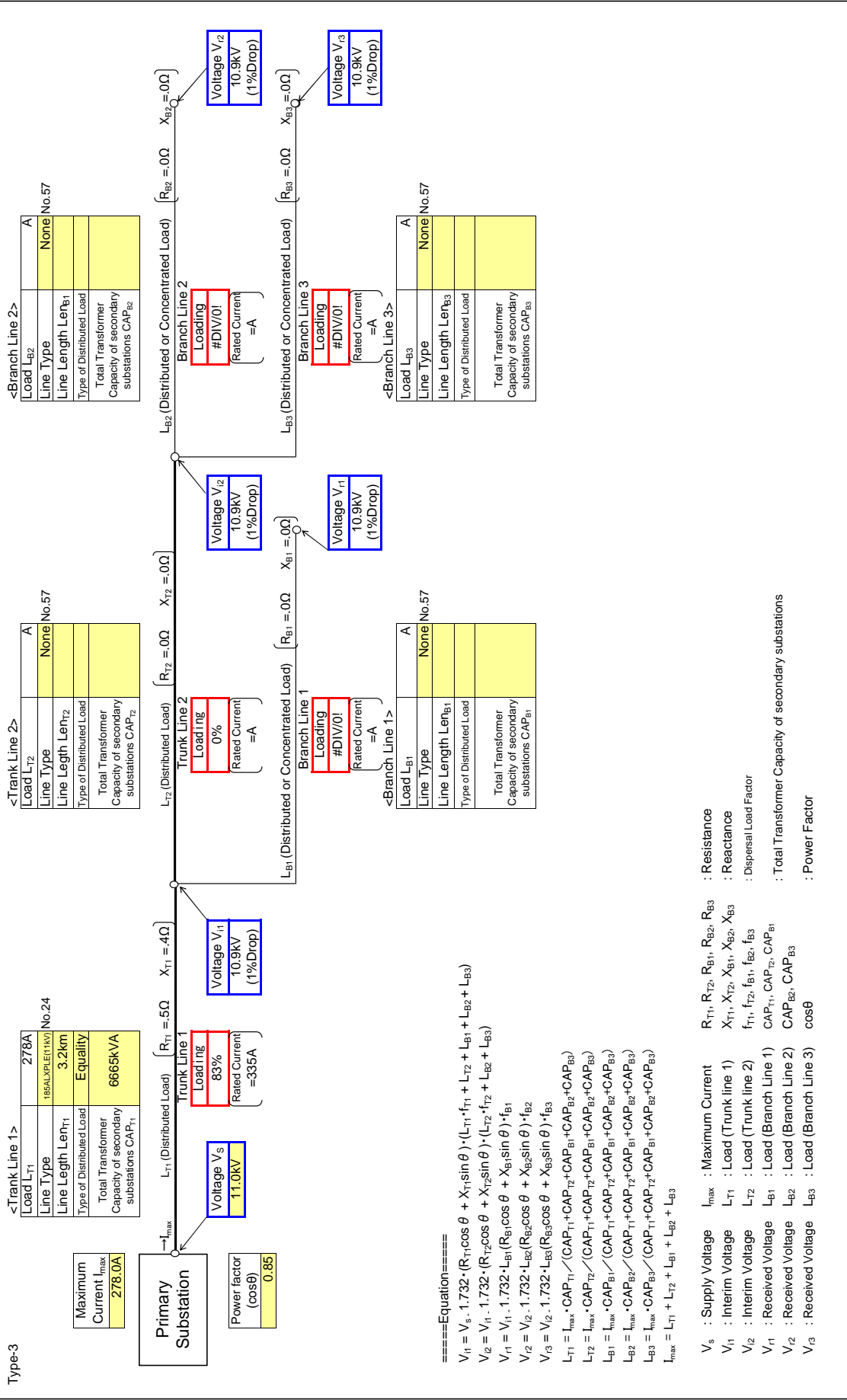
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

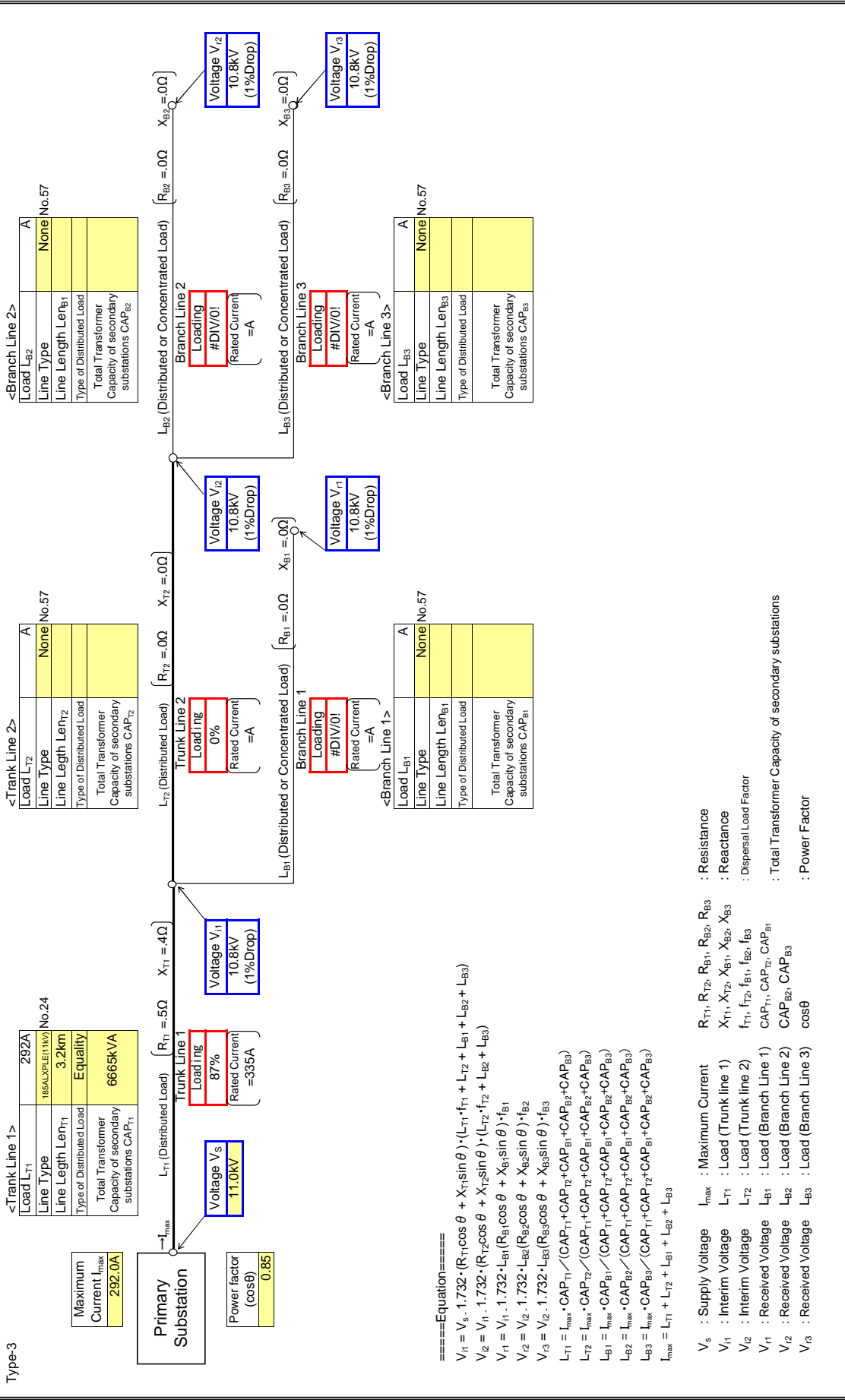
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

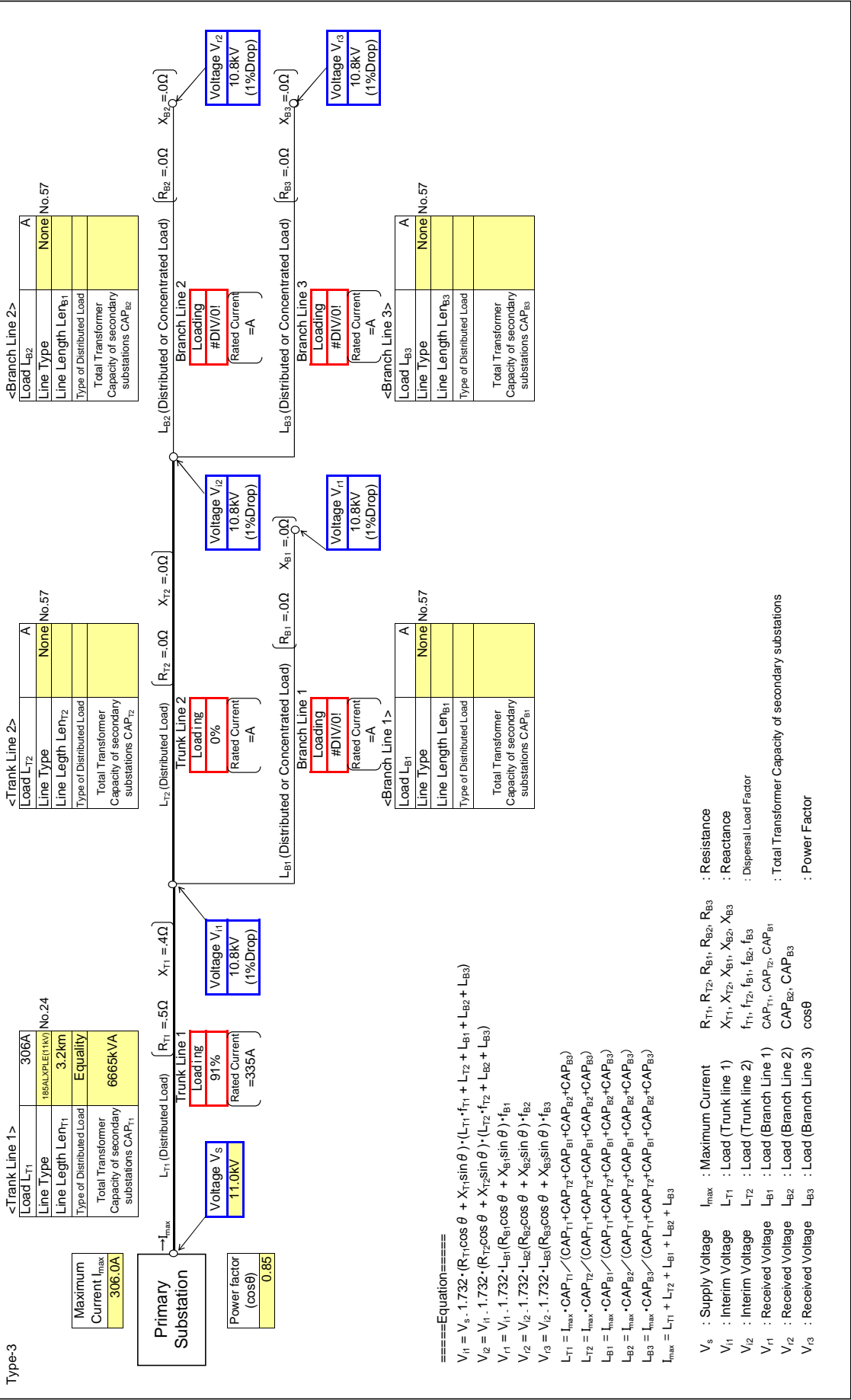
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G32

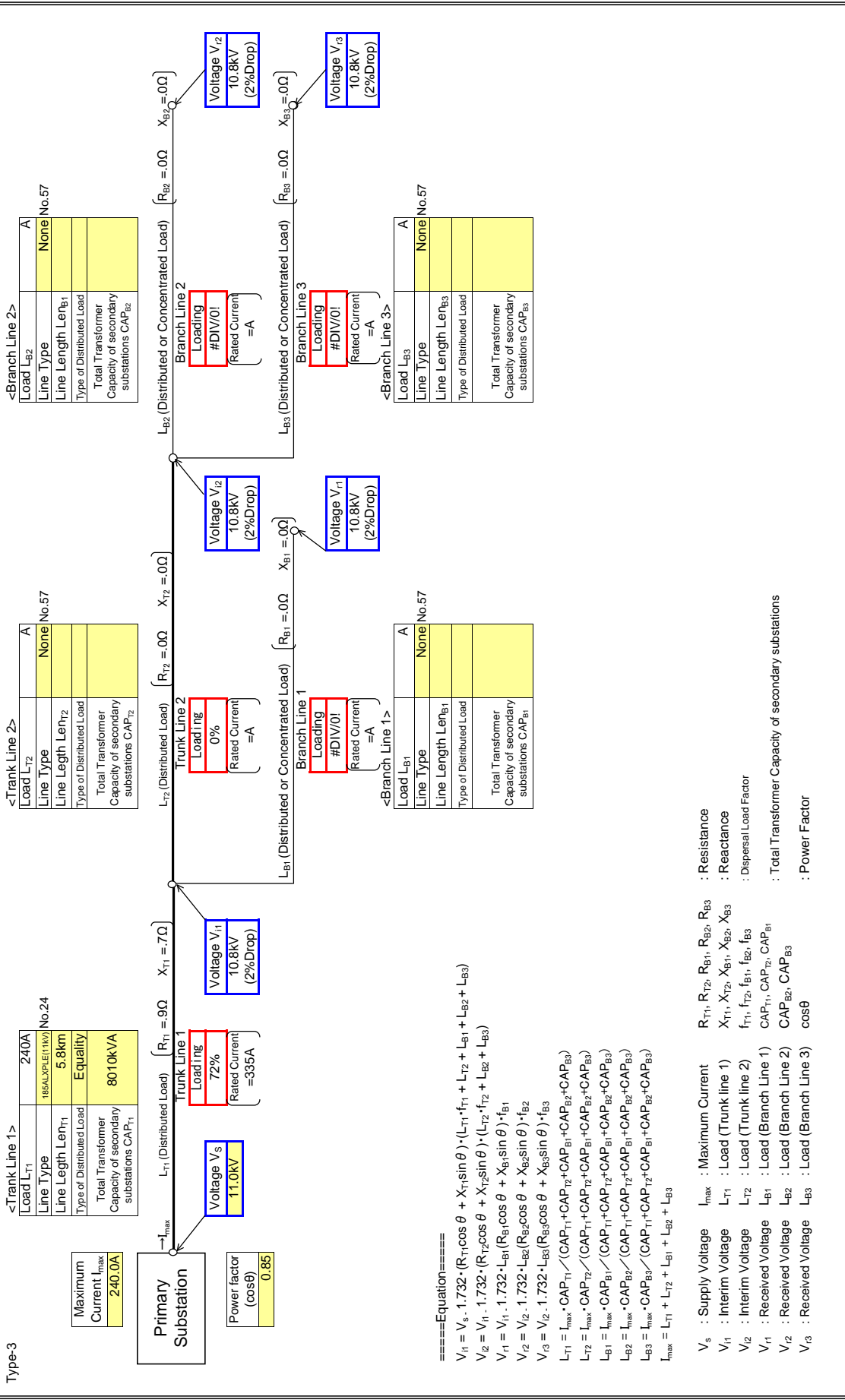
: Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

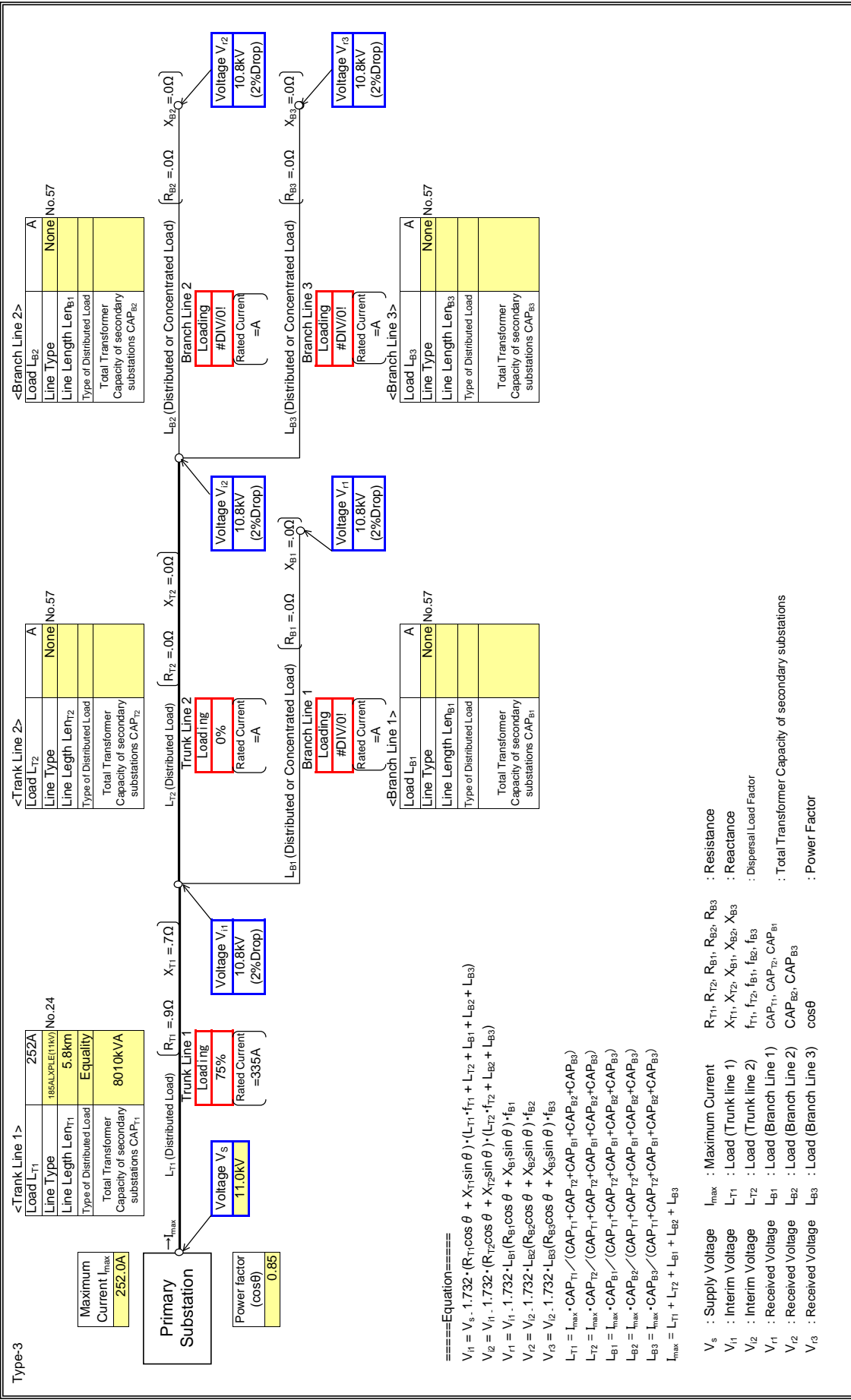
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

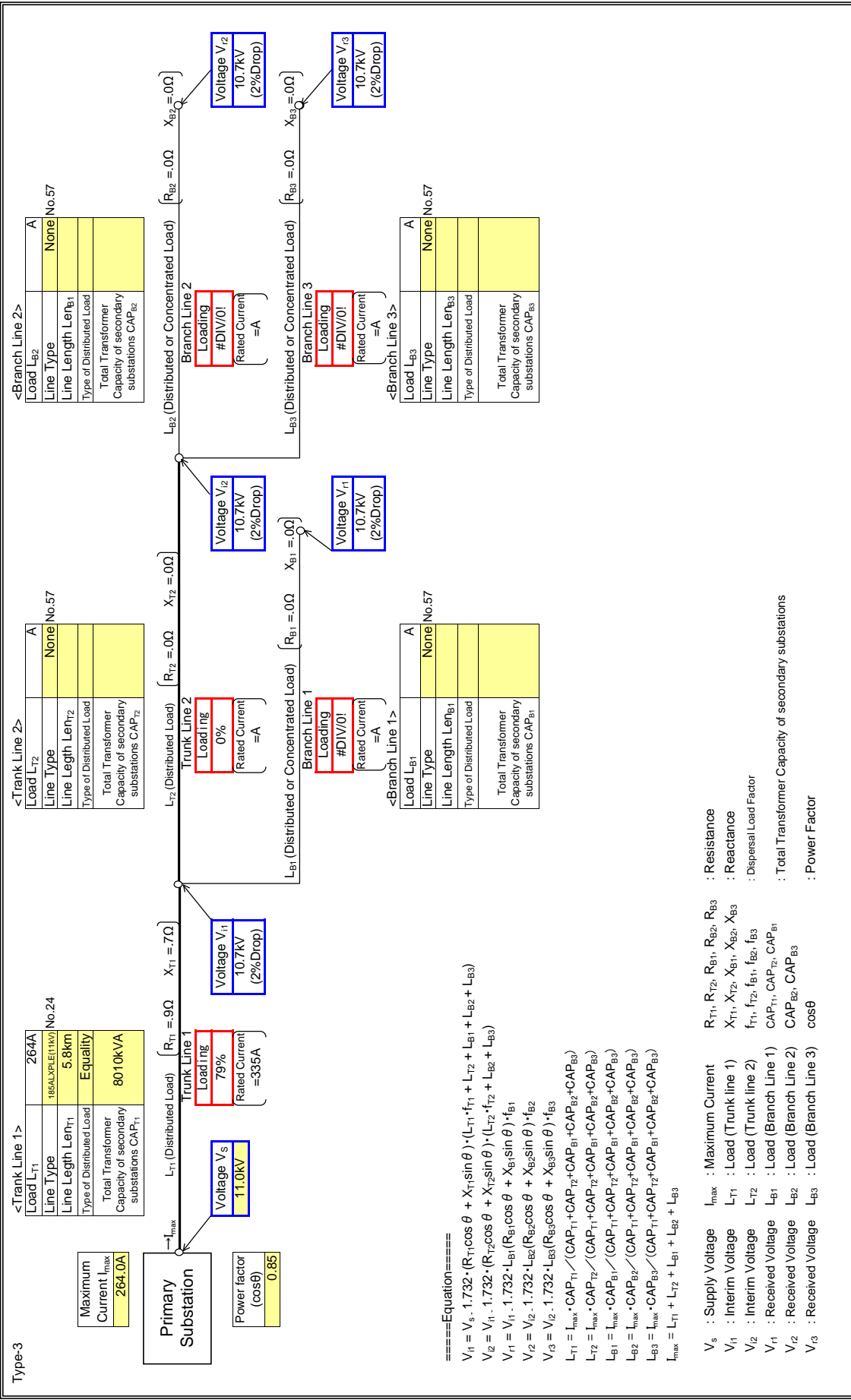
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

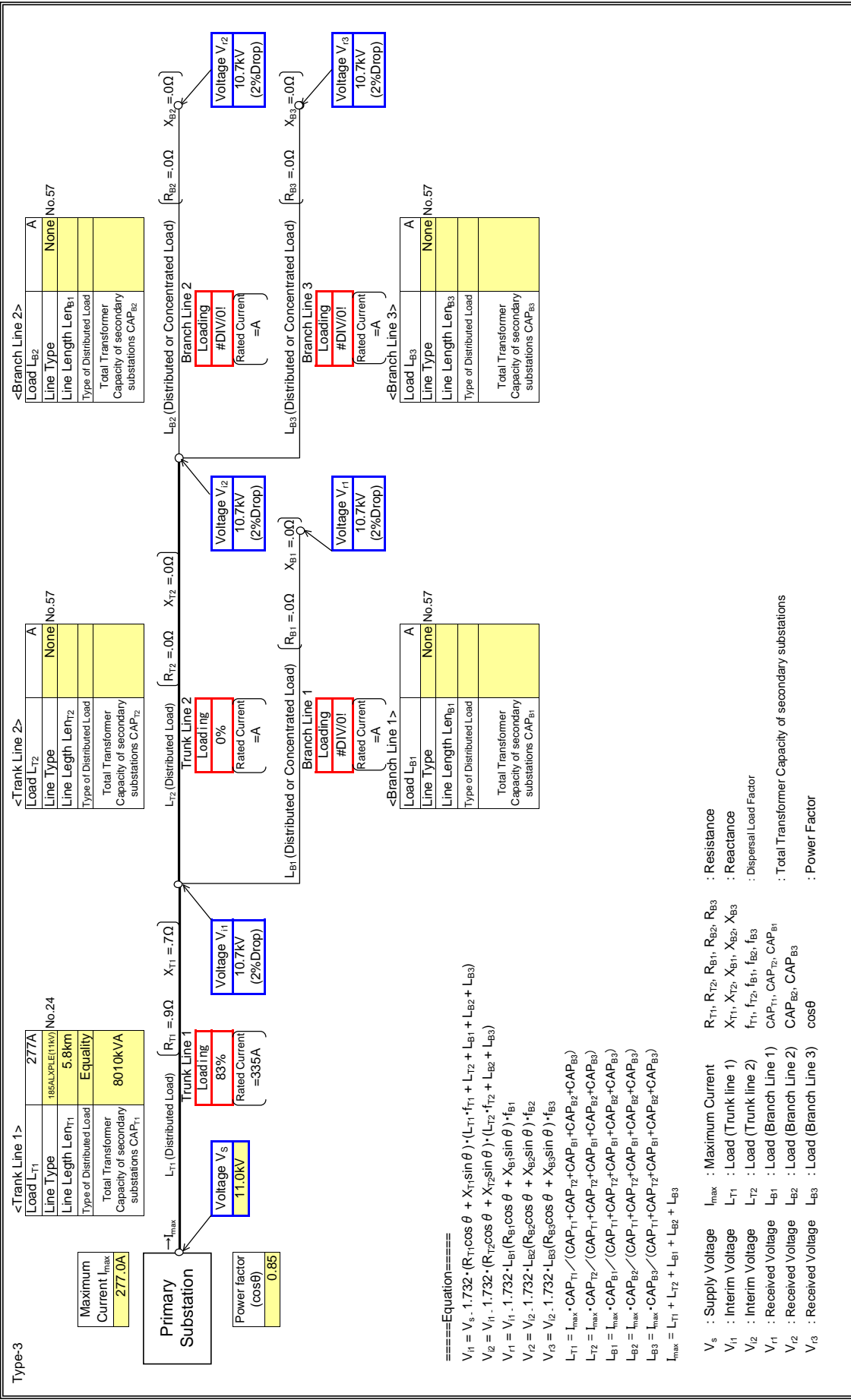
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

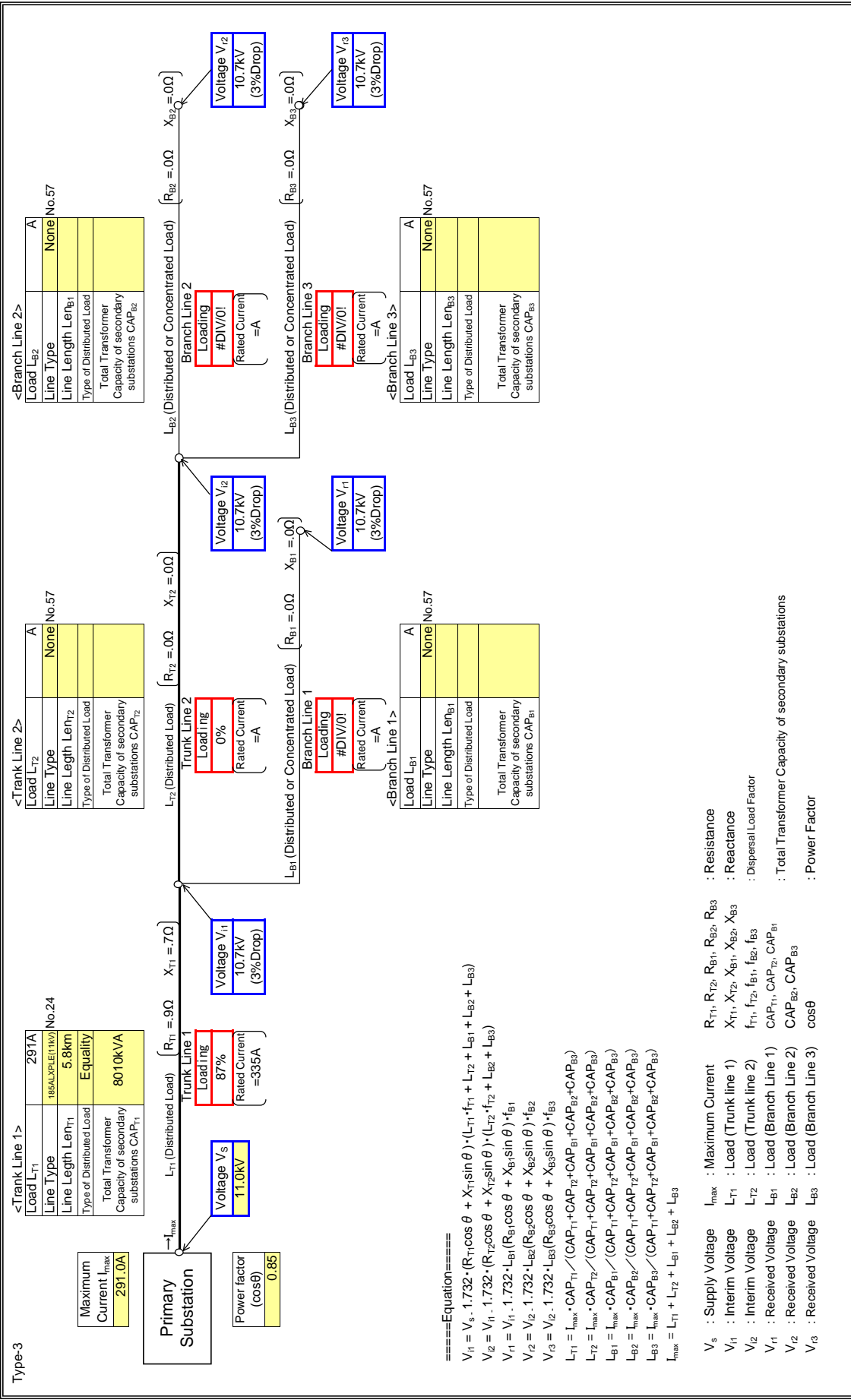
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

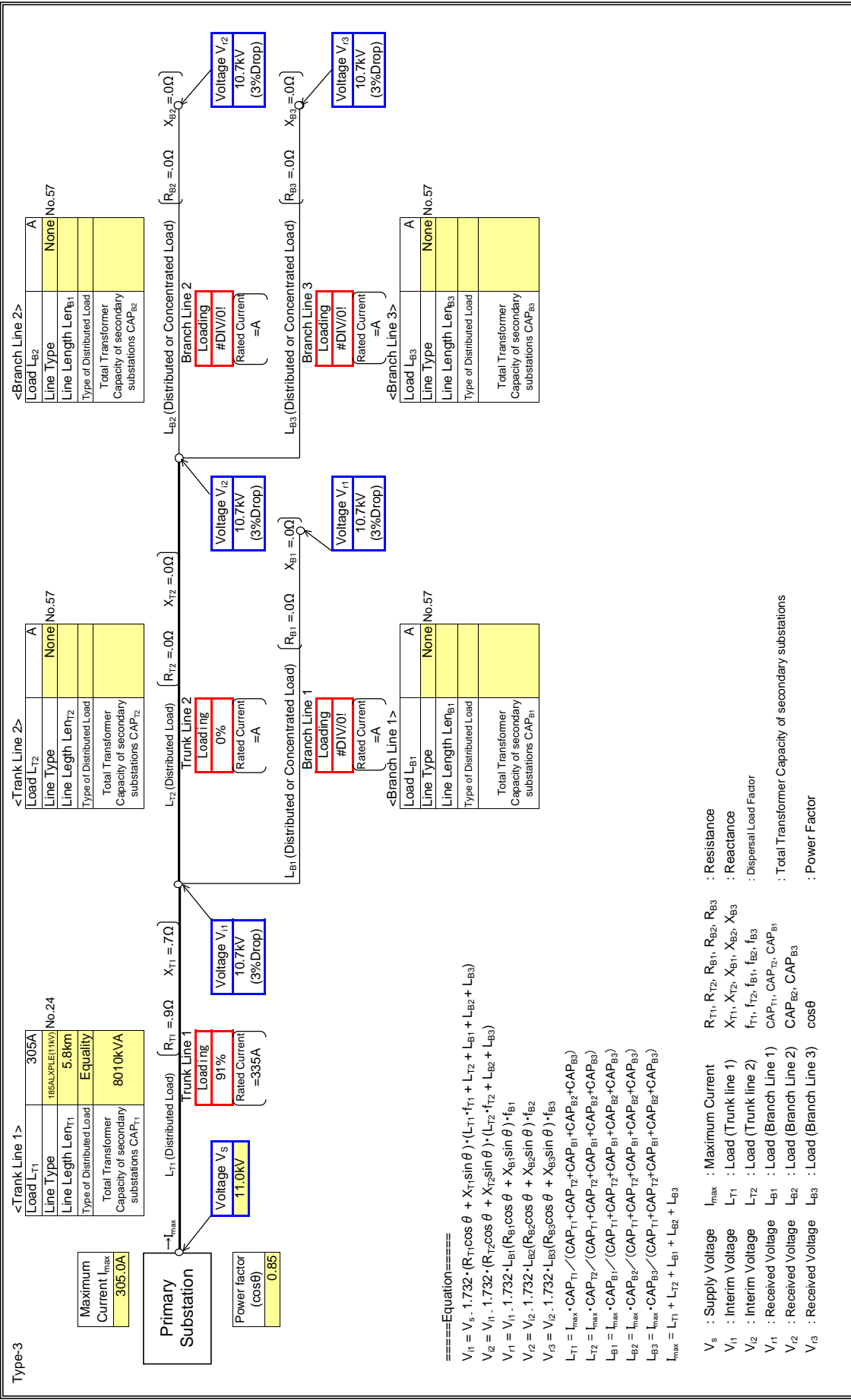
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

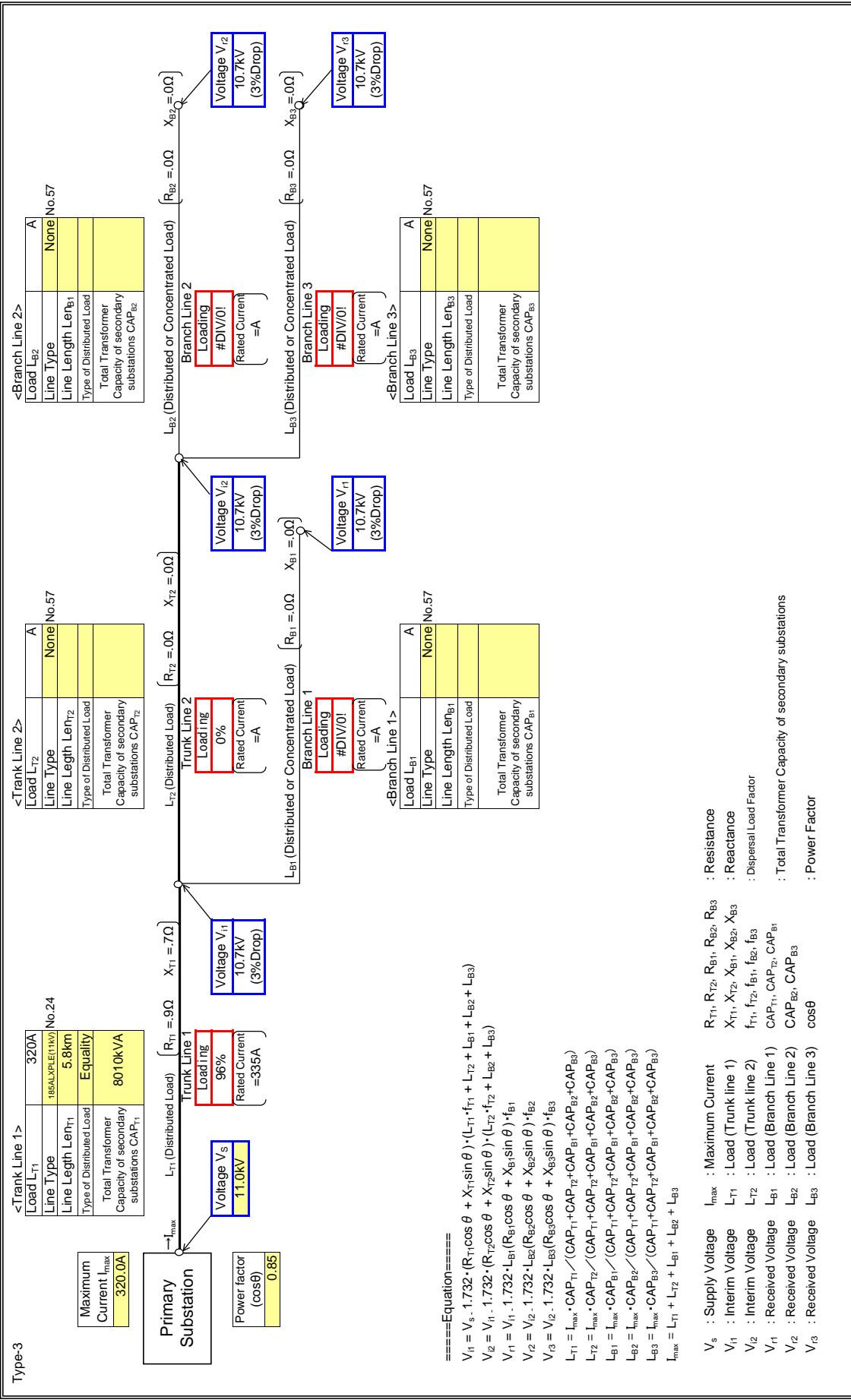
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

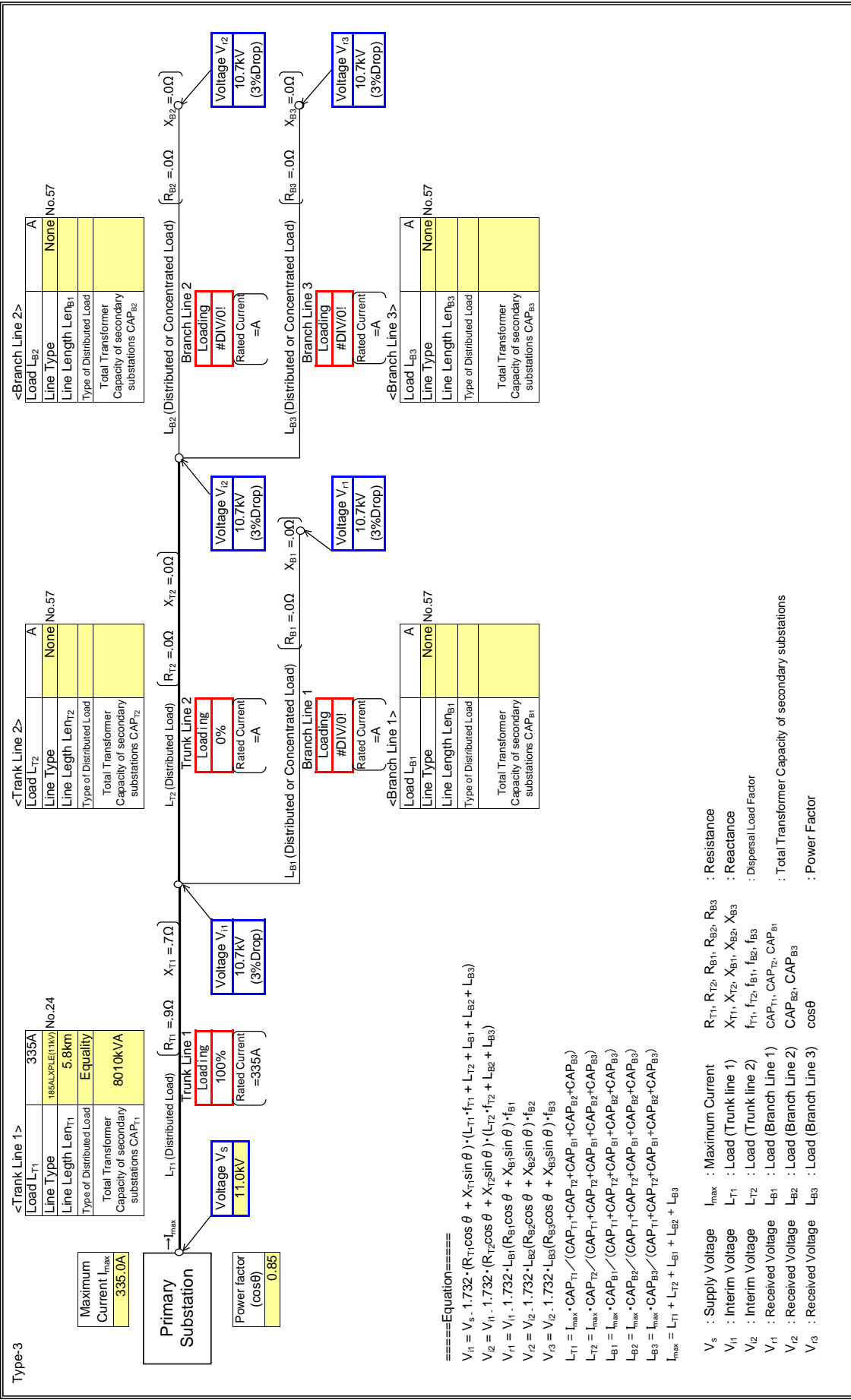
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

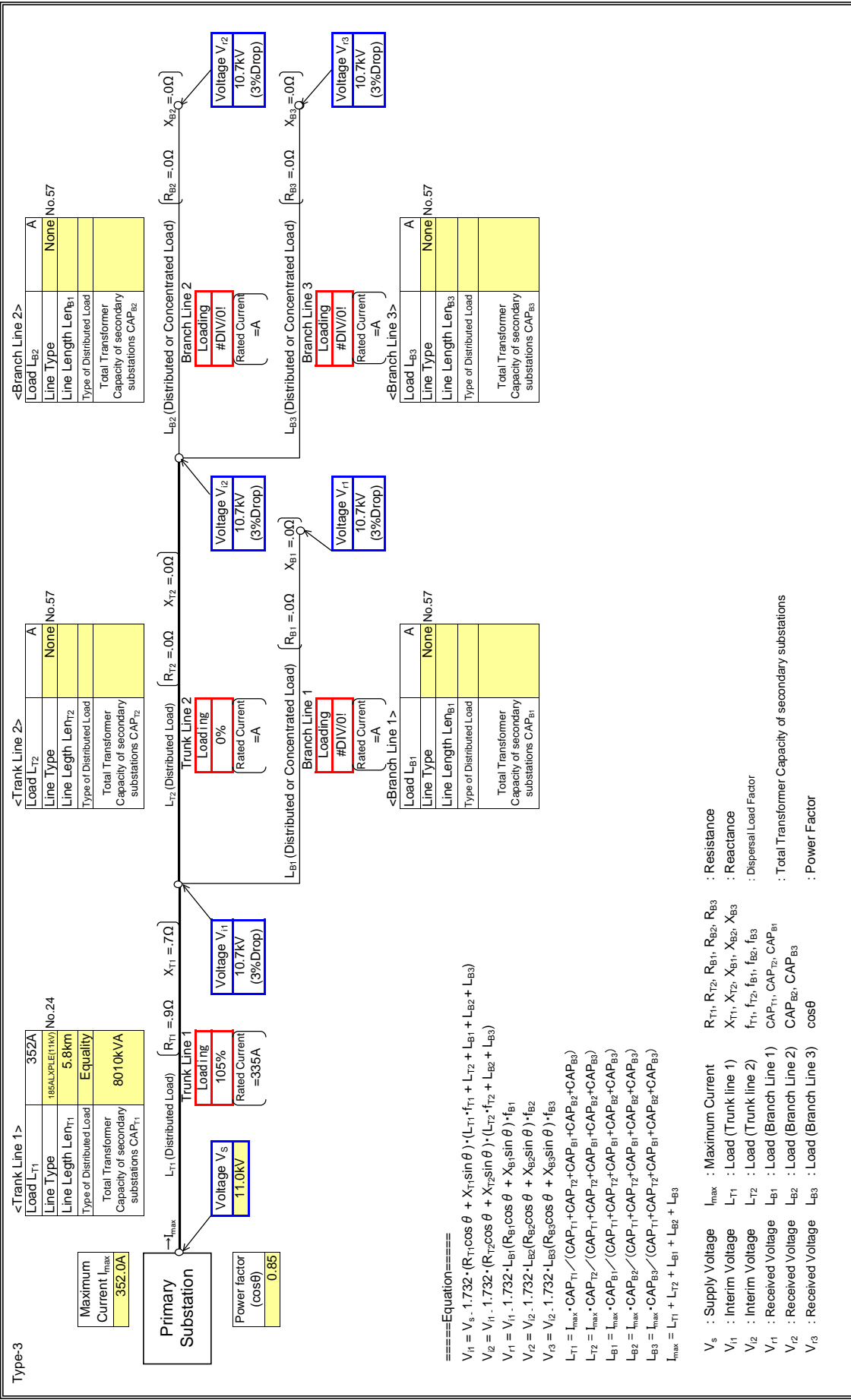
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

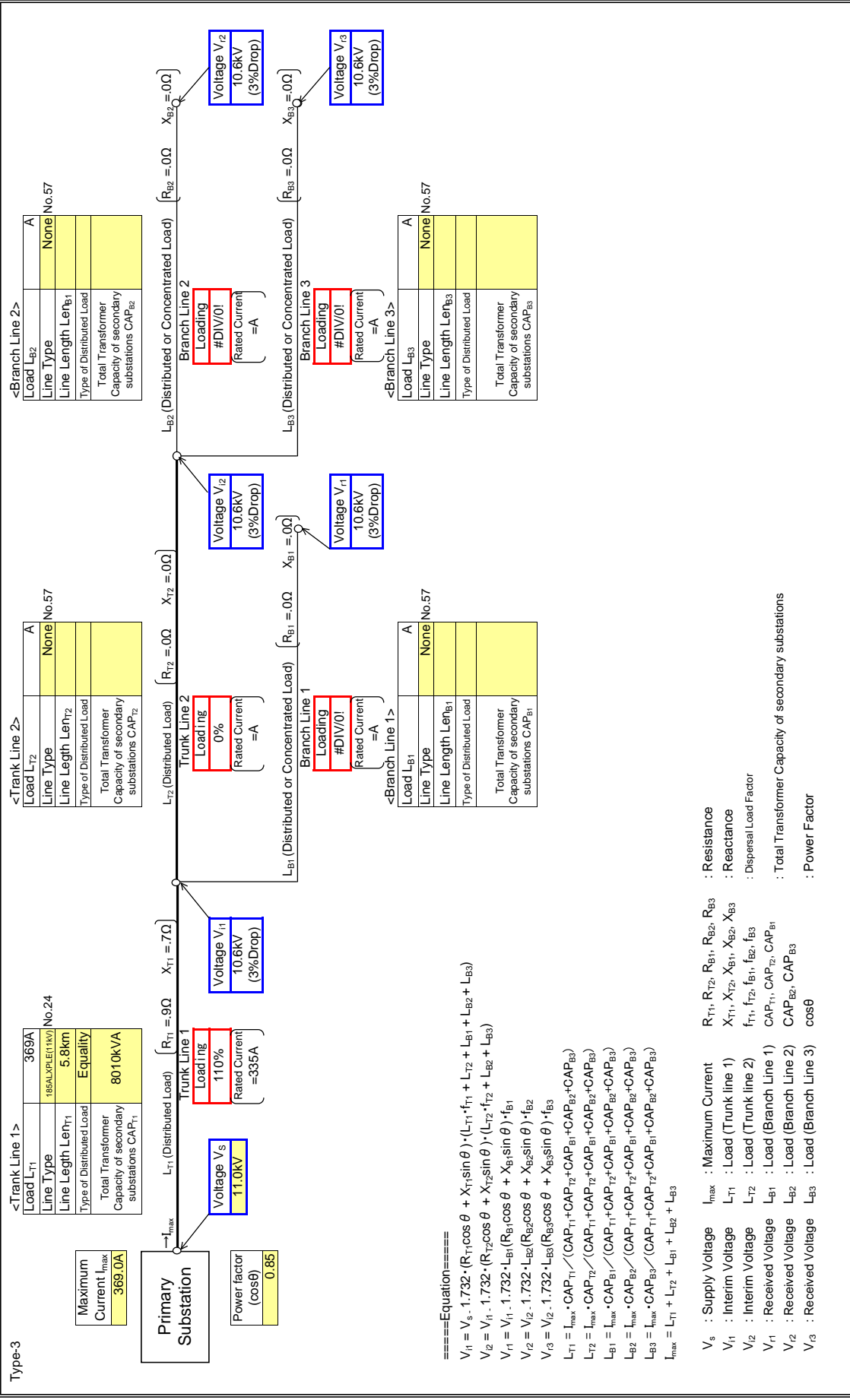
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

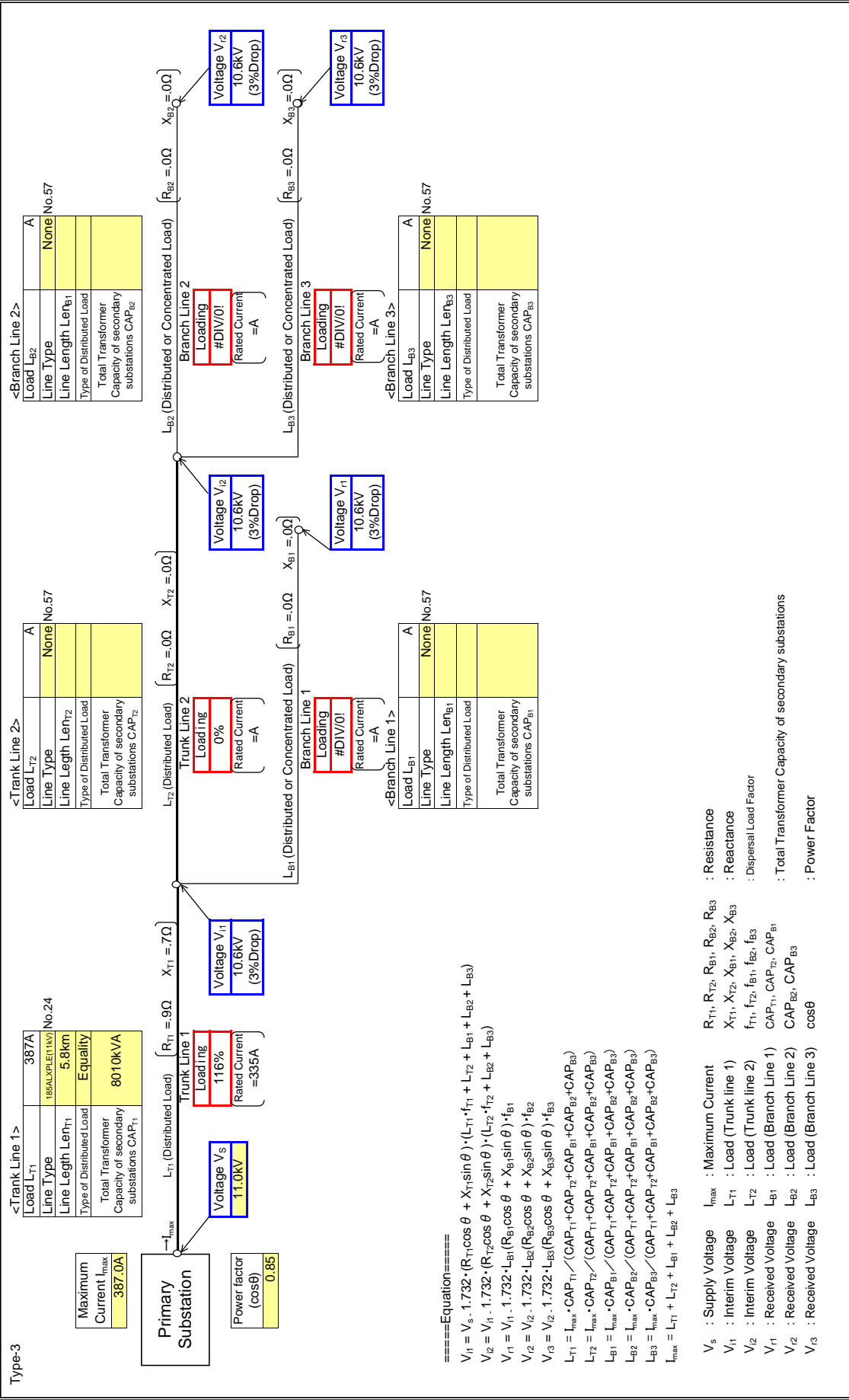
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

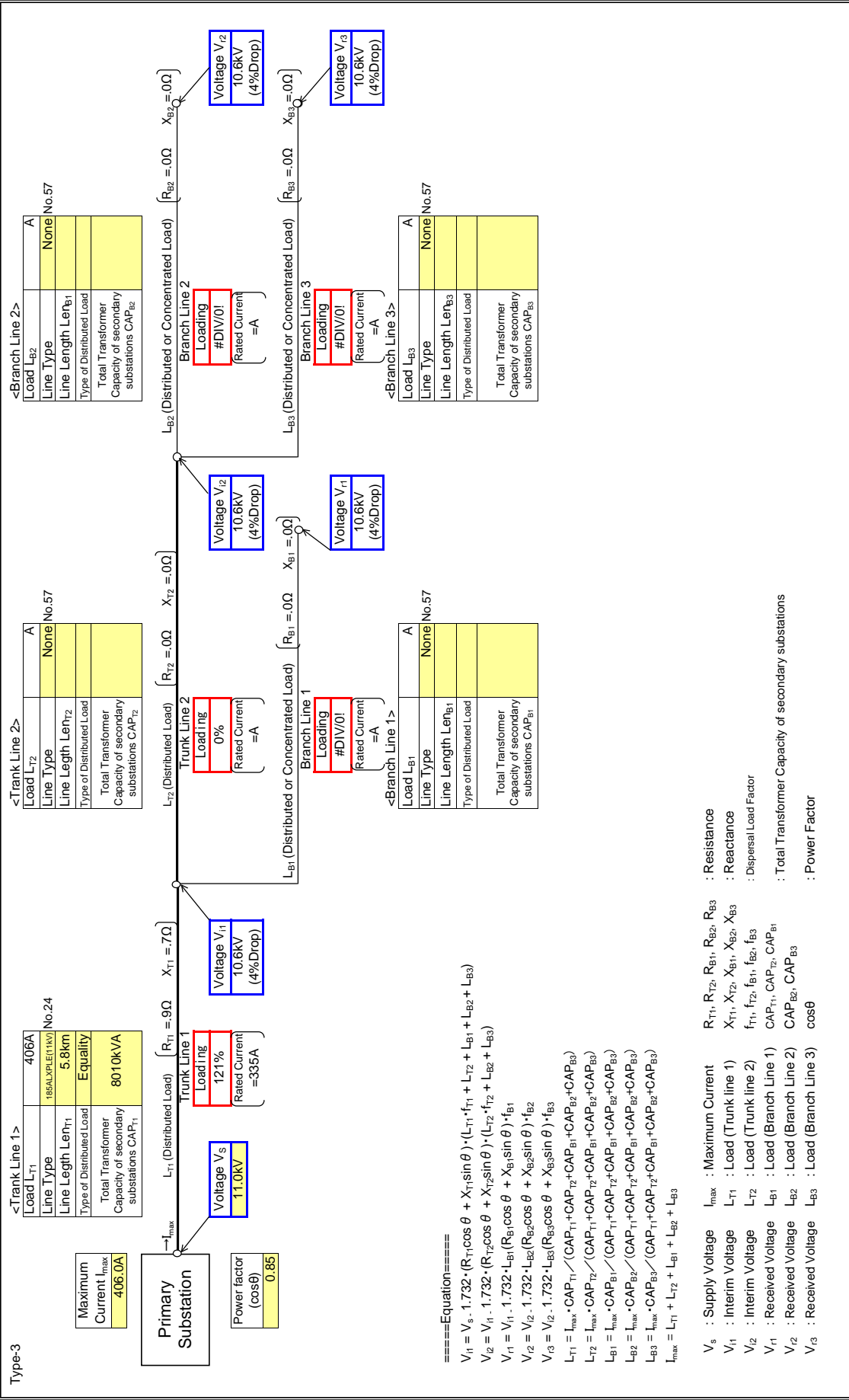
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	G56

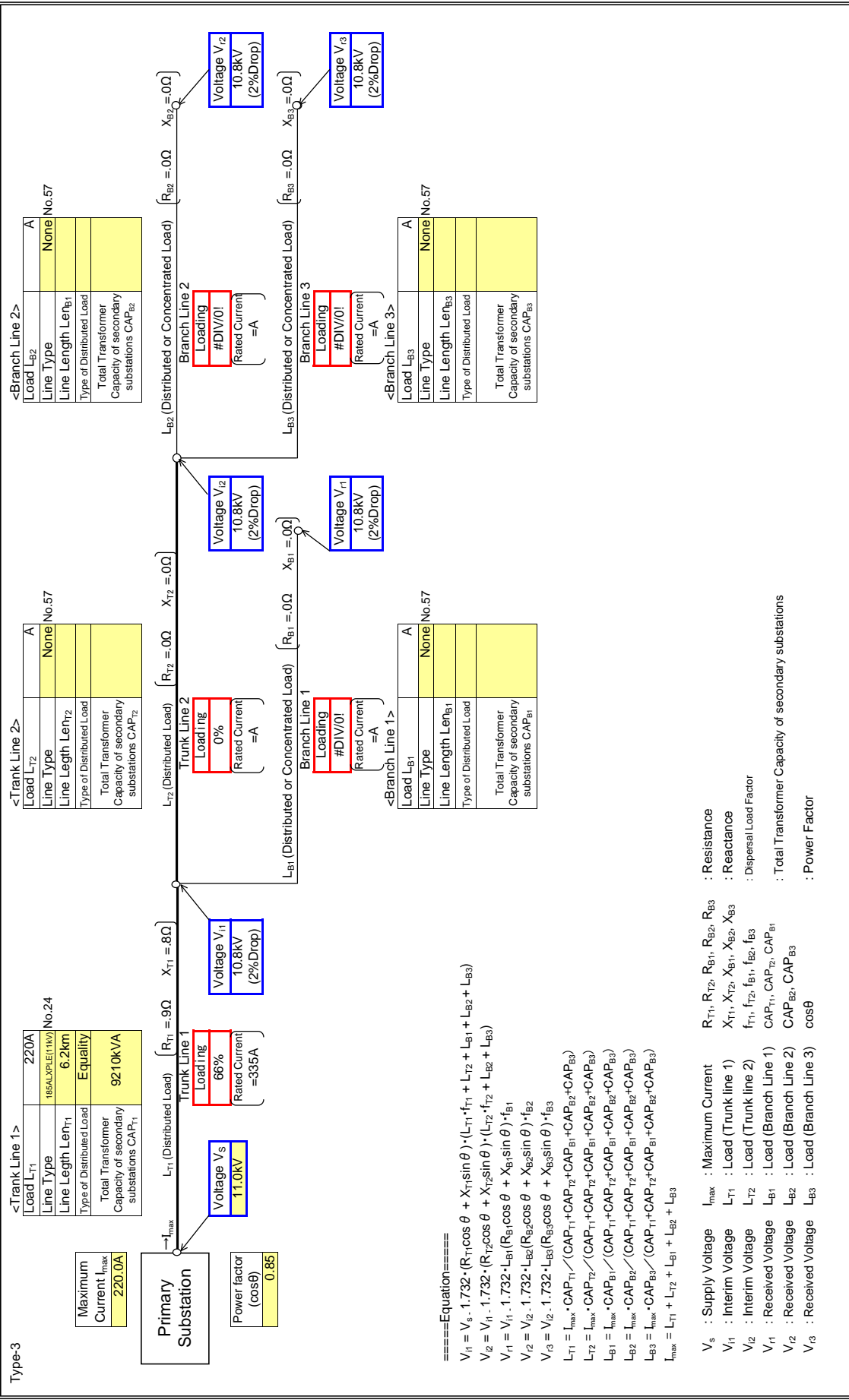
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

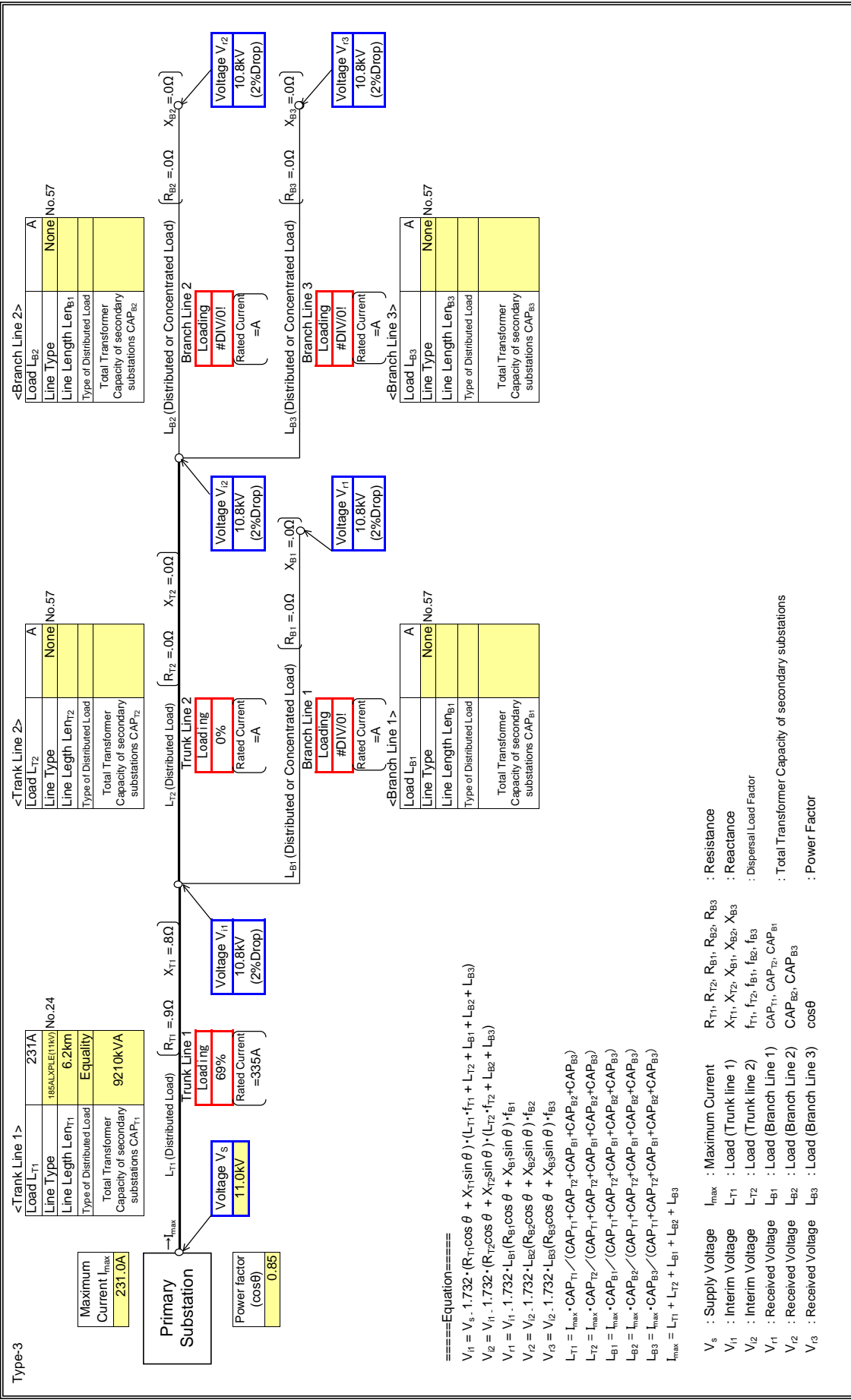
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

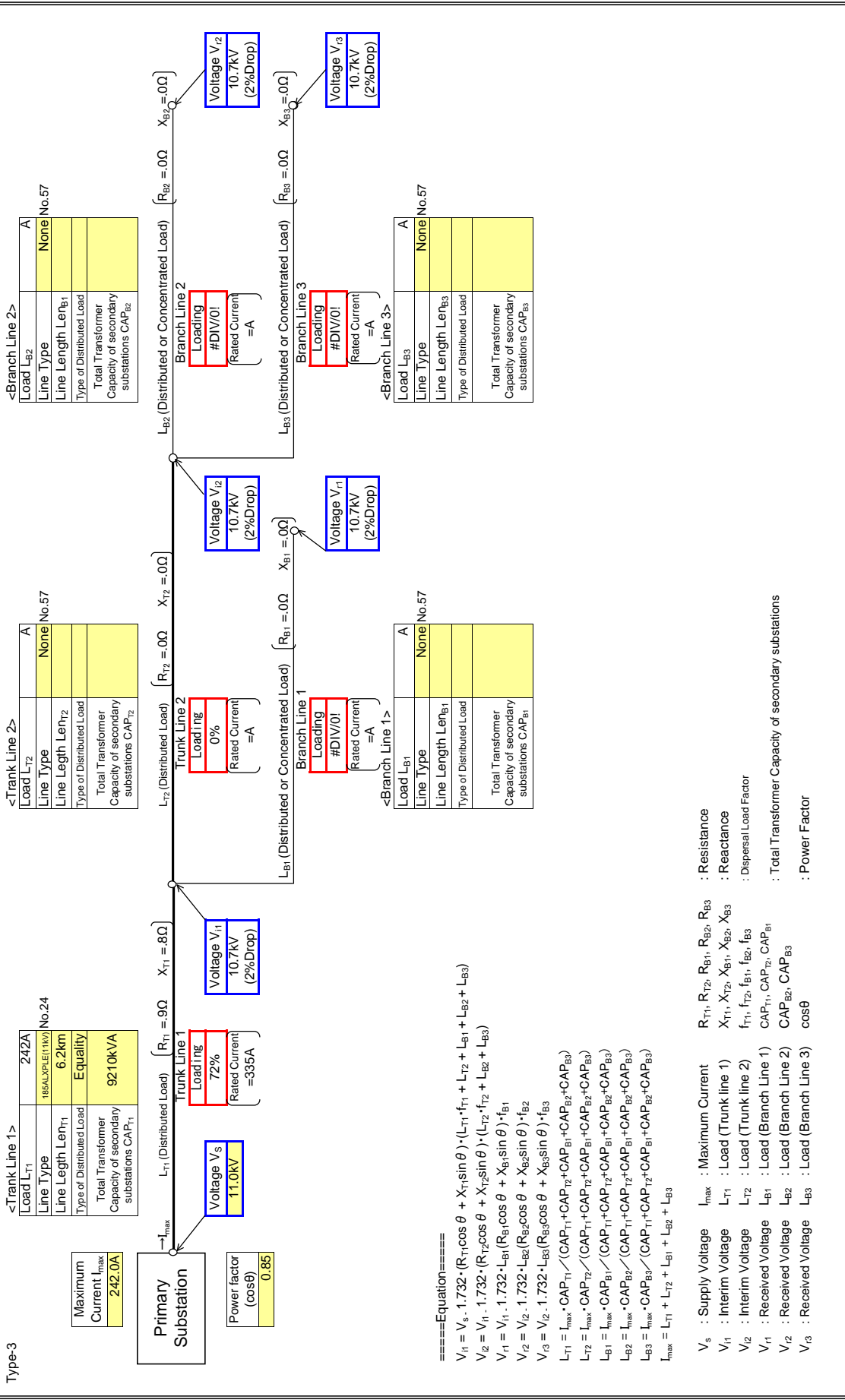
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

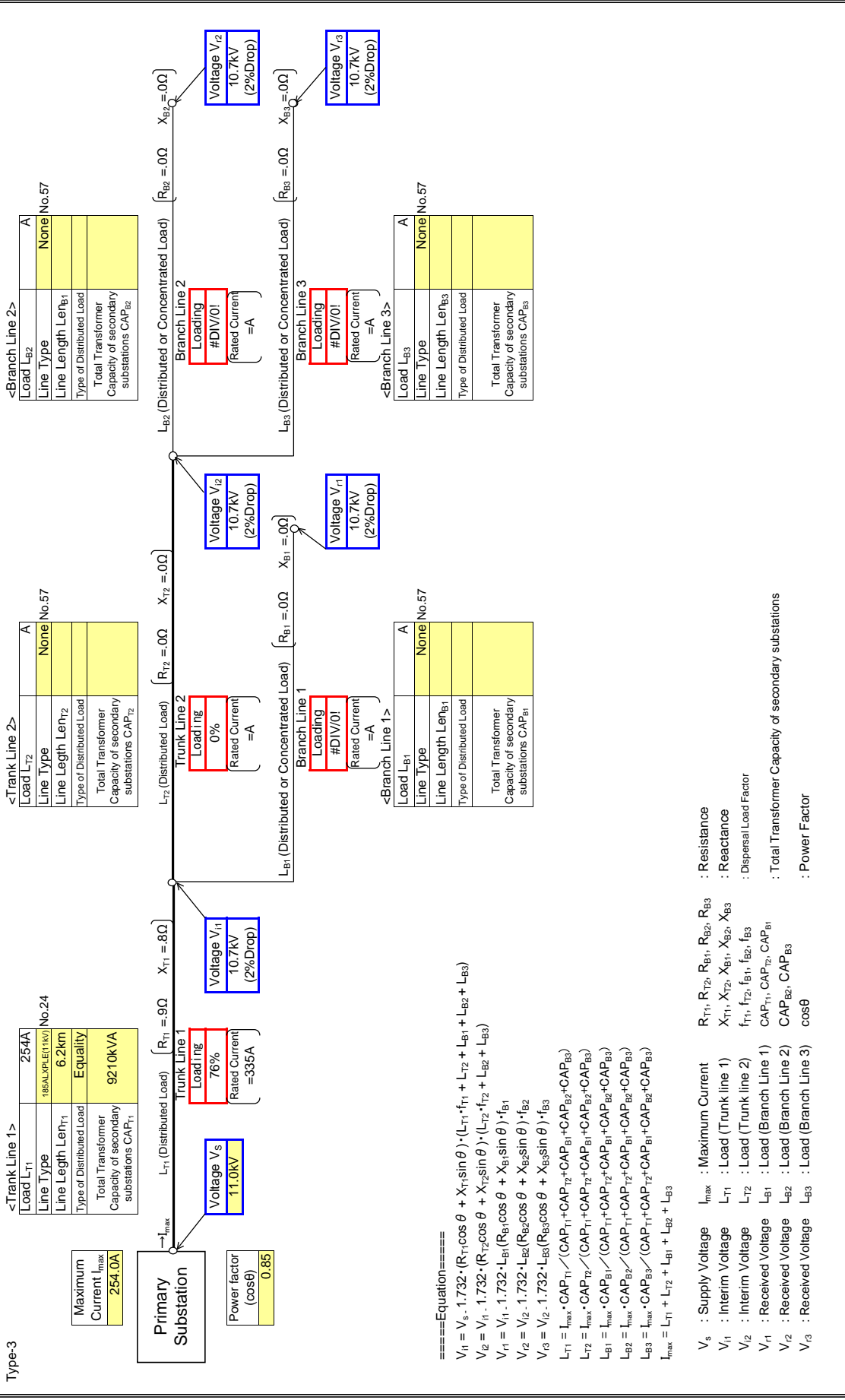
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

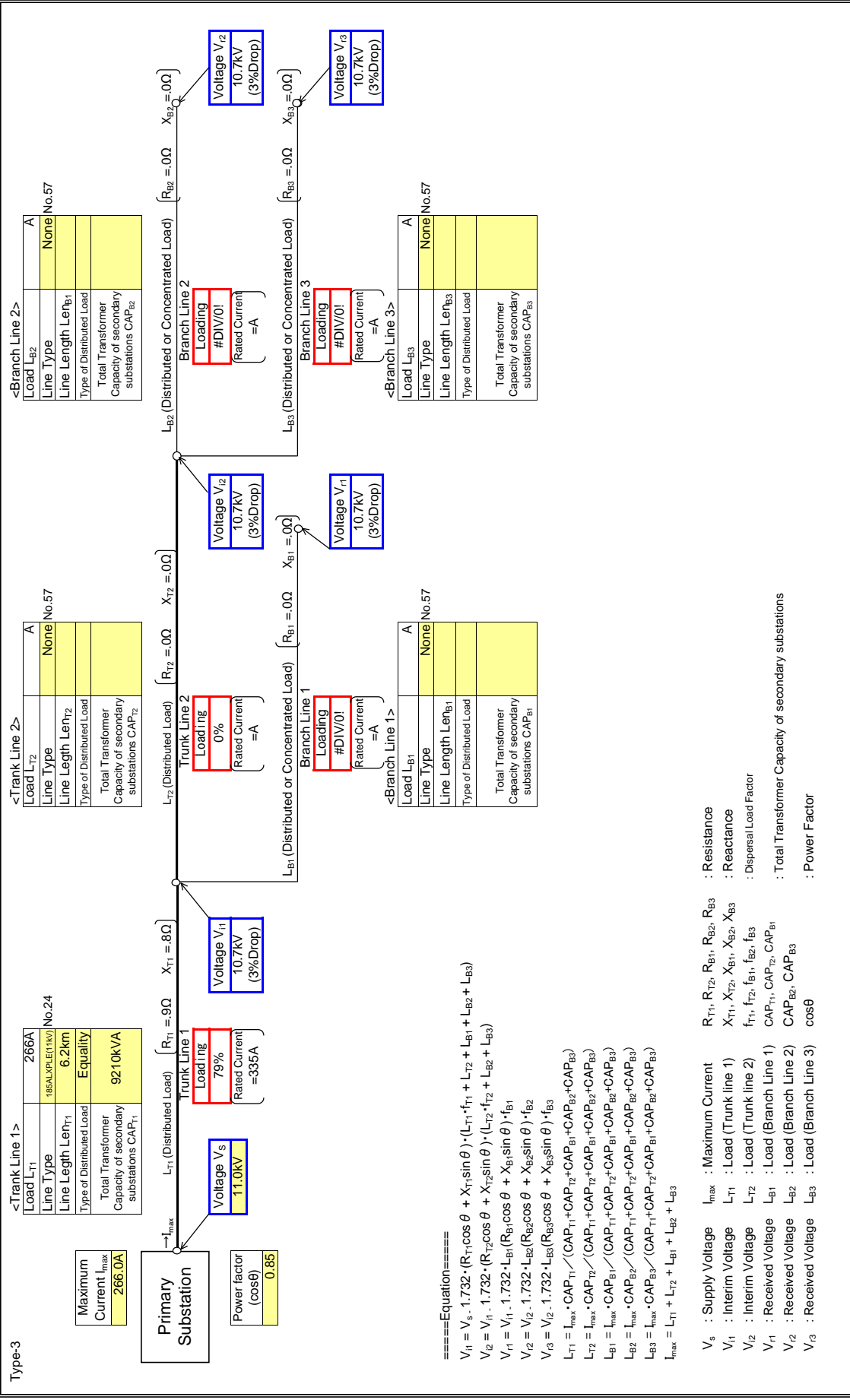
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

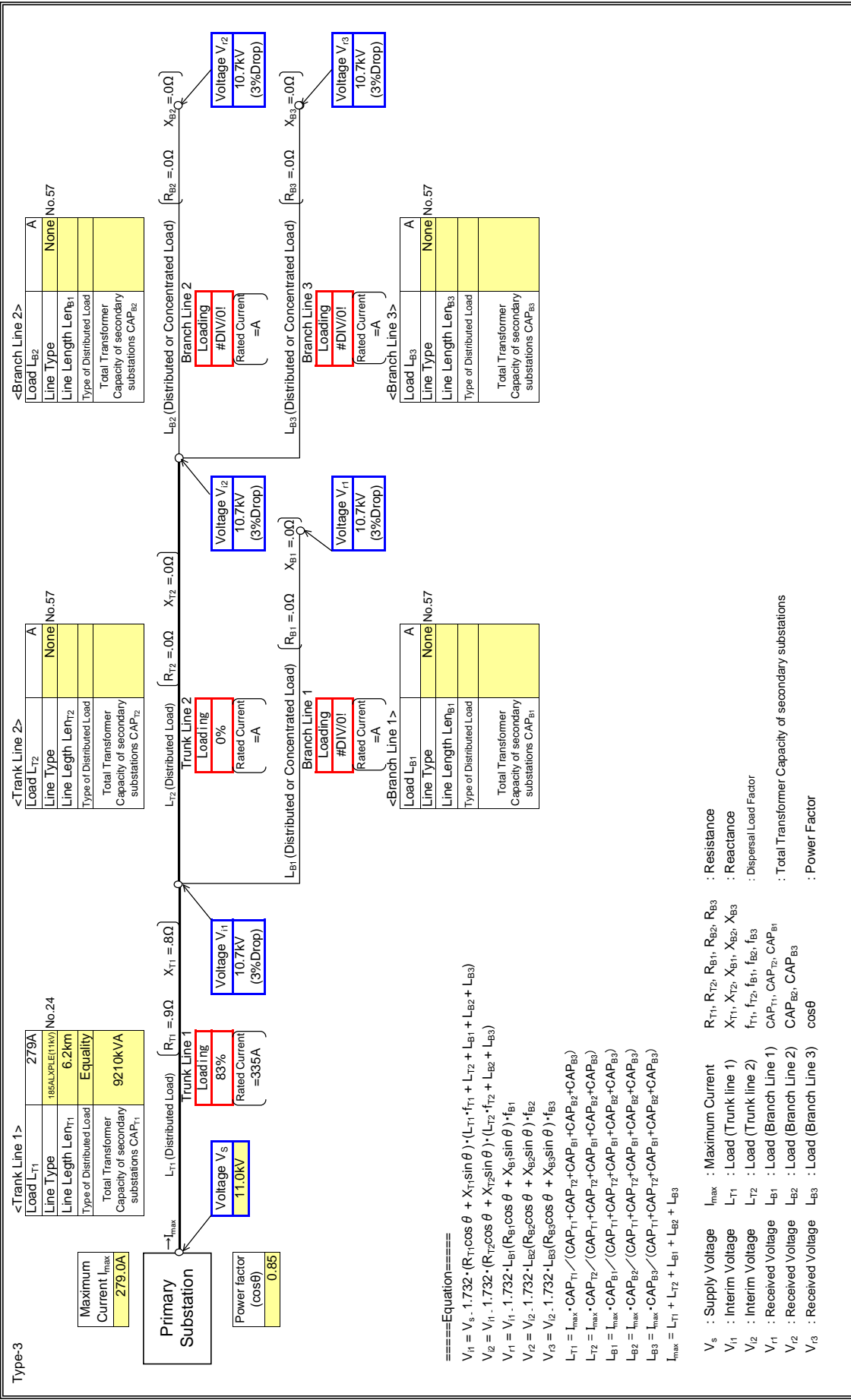
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

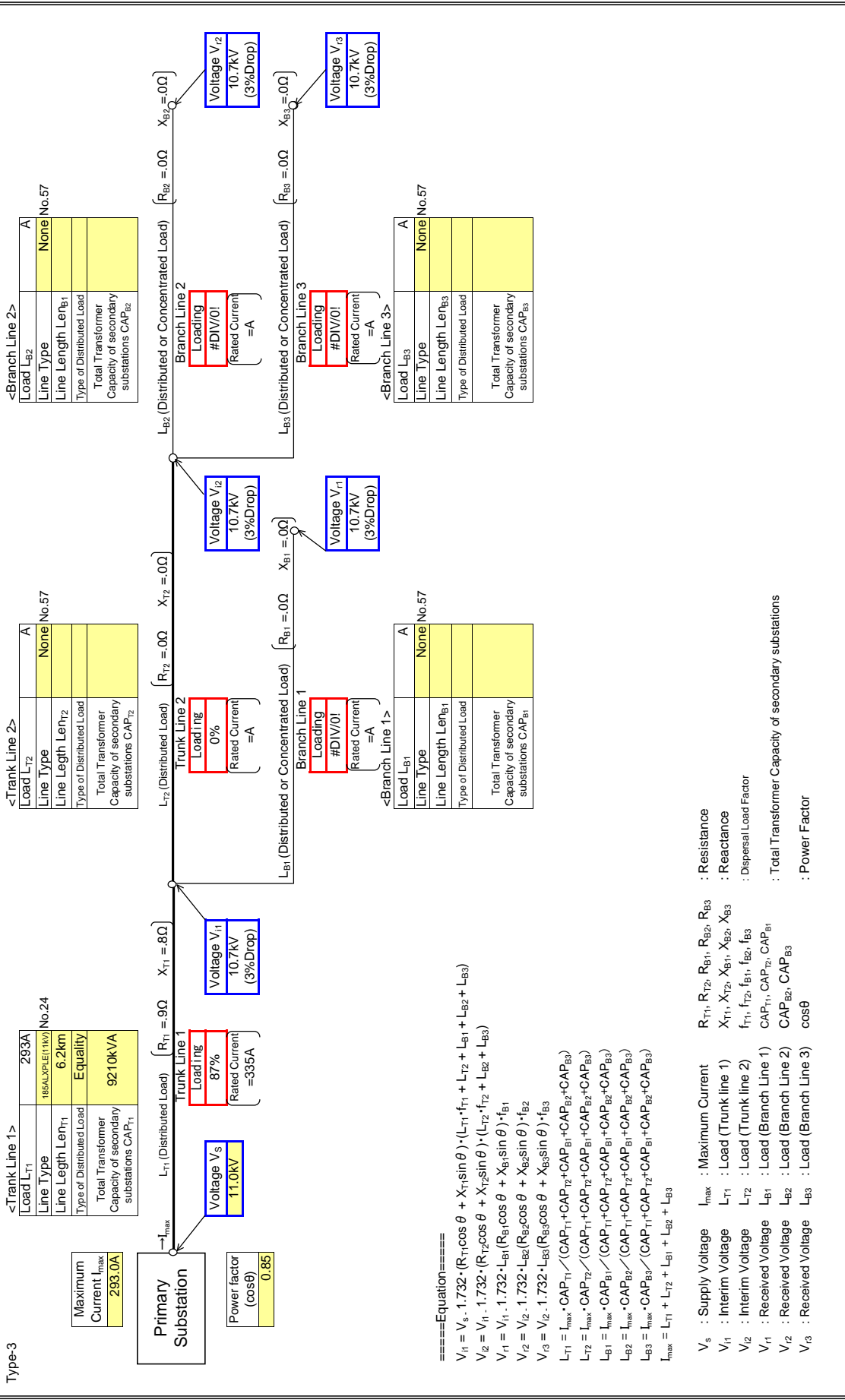
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

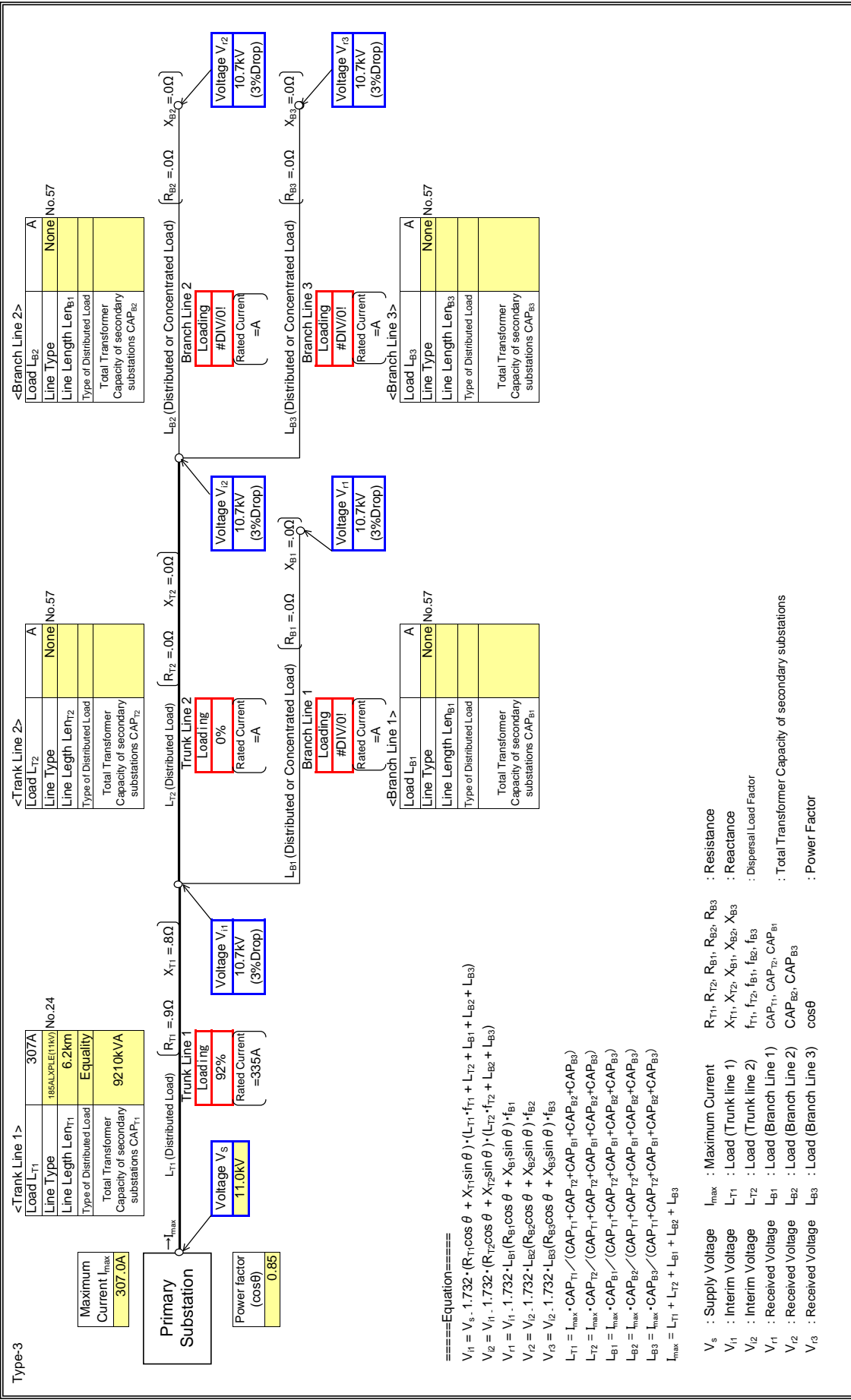
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

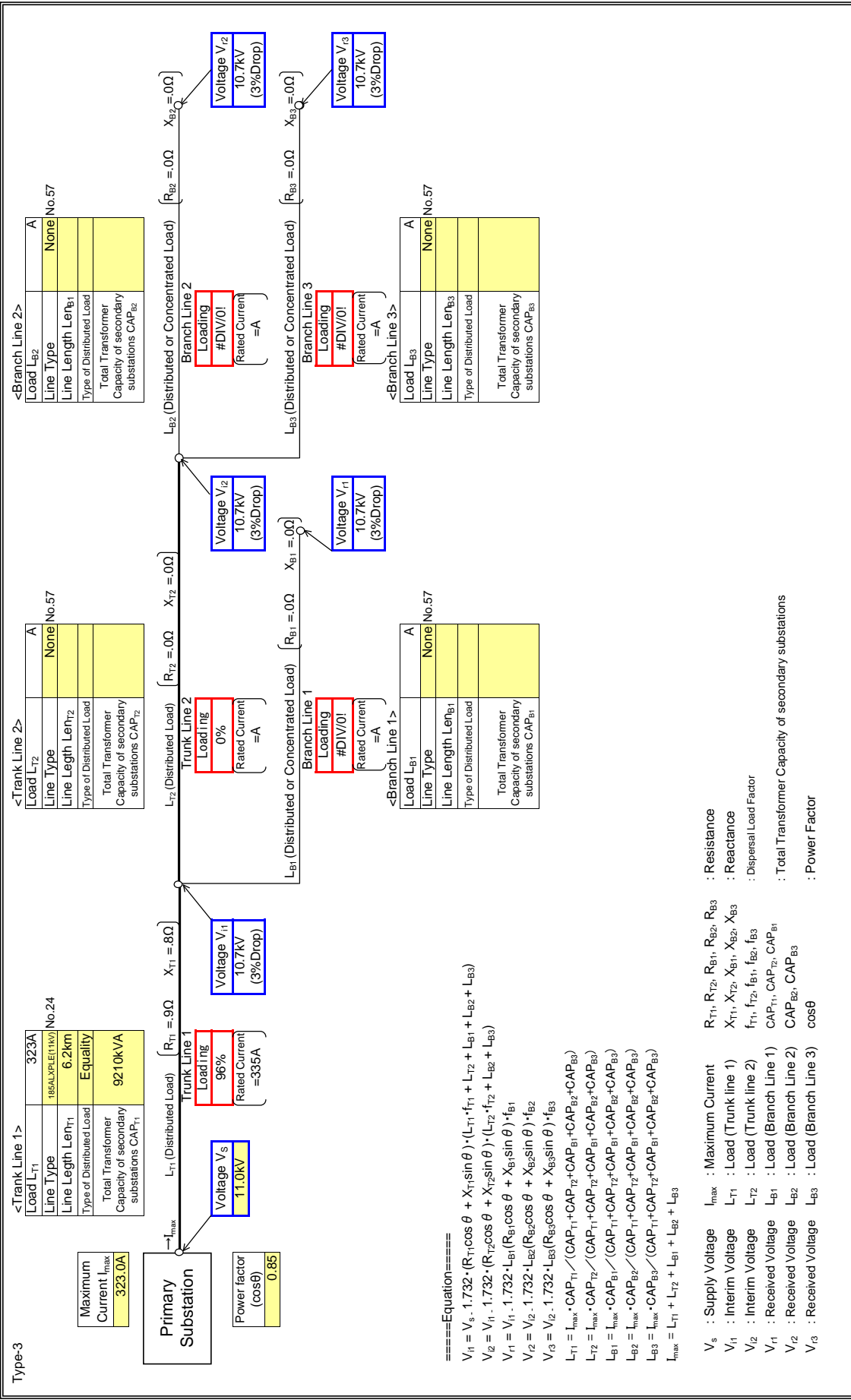
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

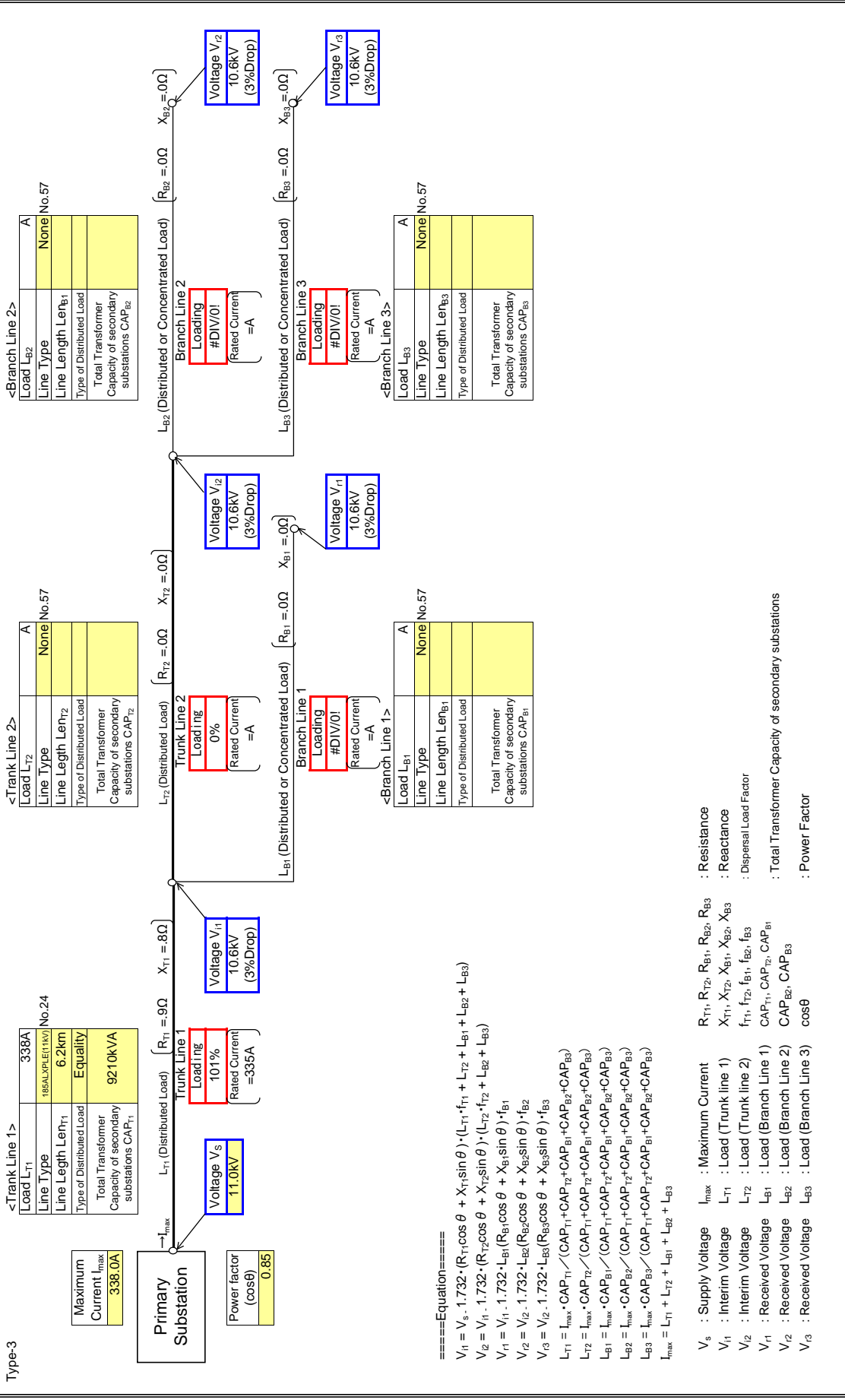
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

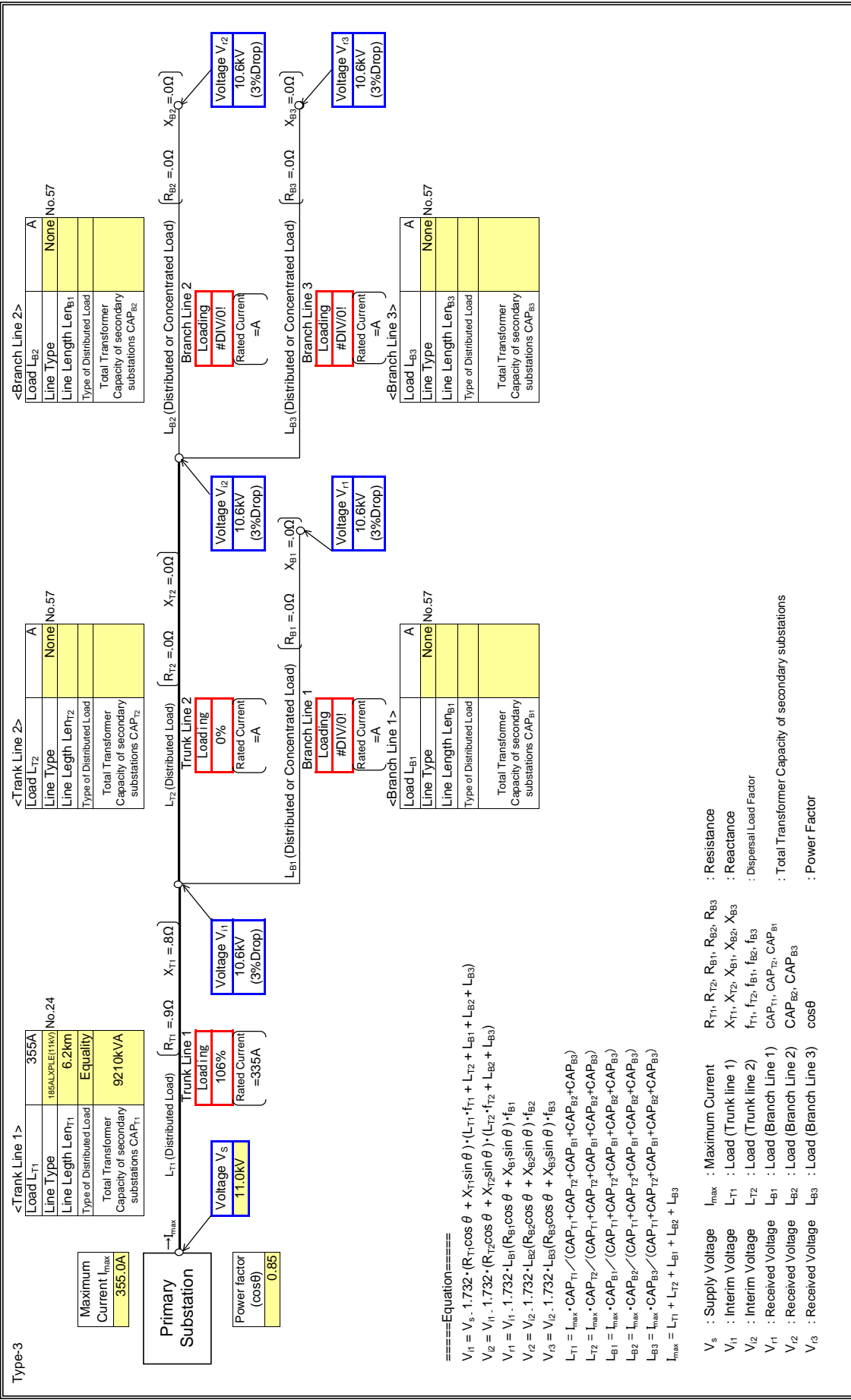
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

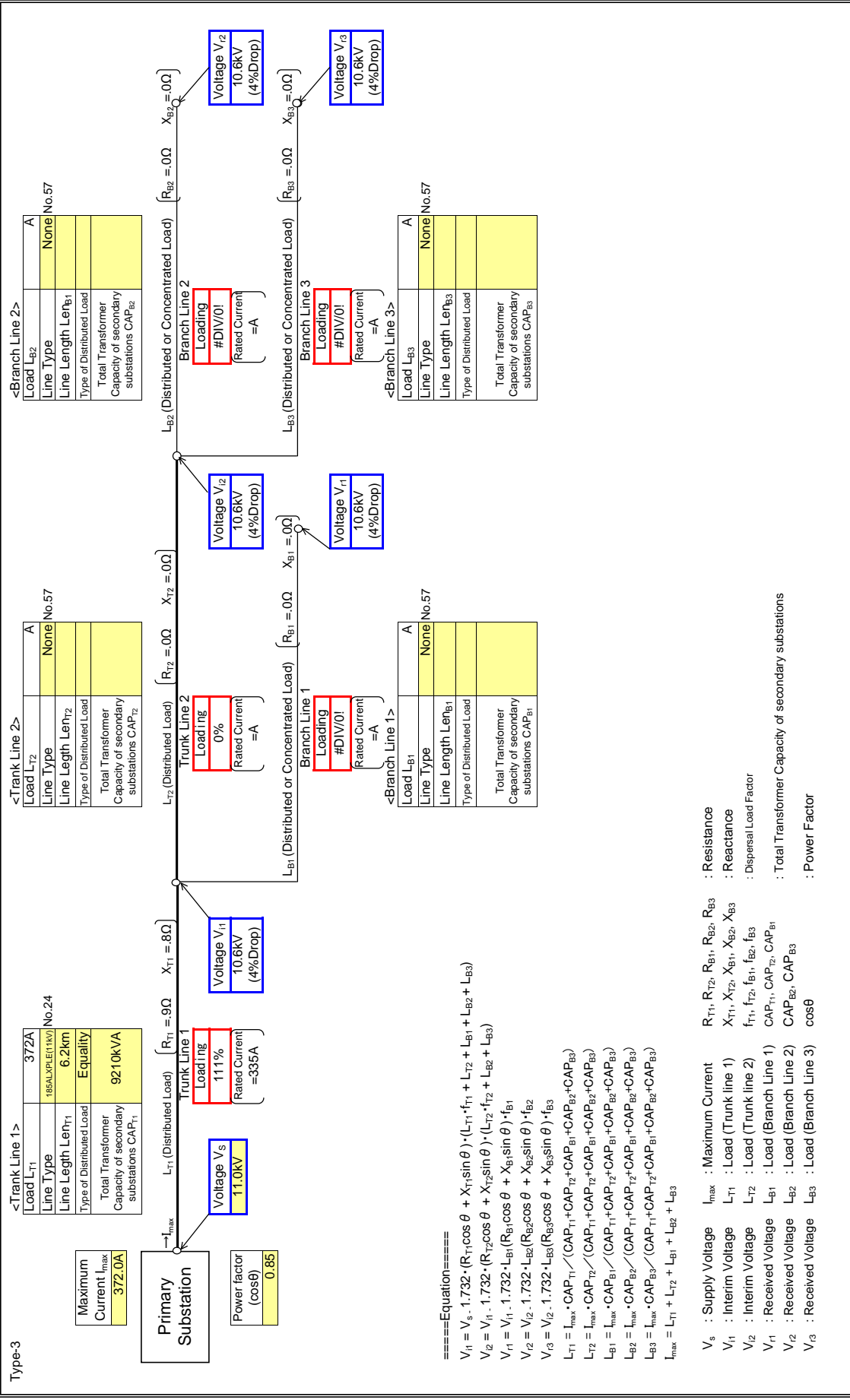
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION G
Feeder Name	GE19

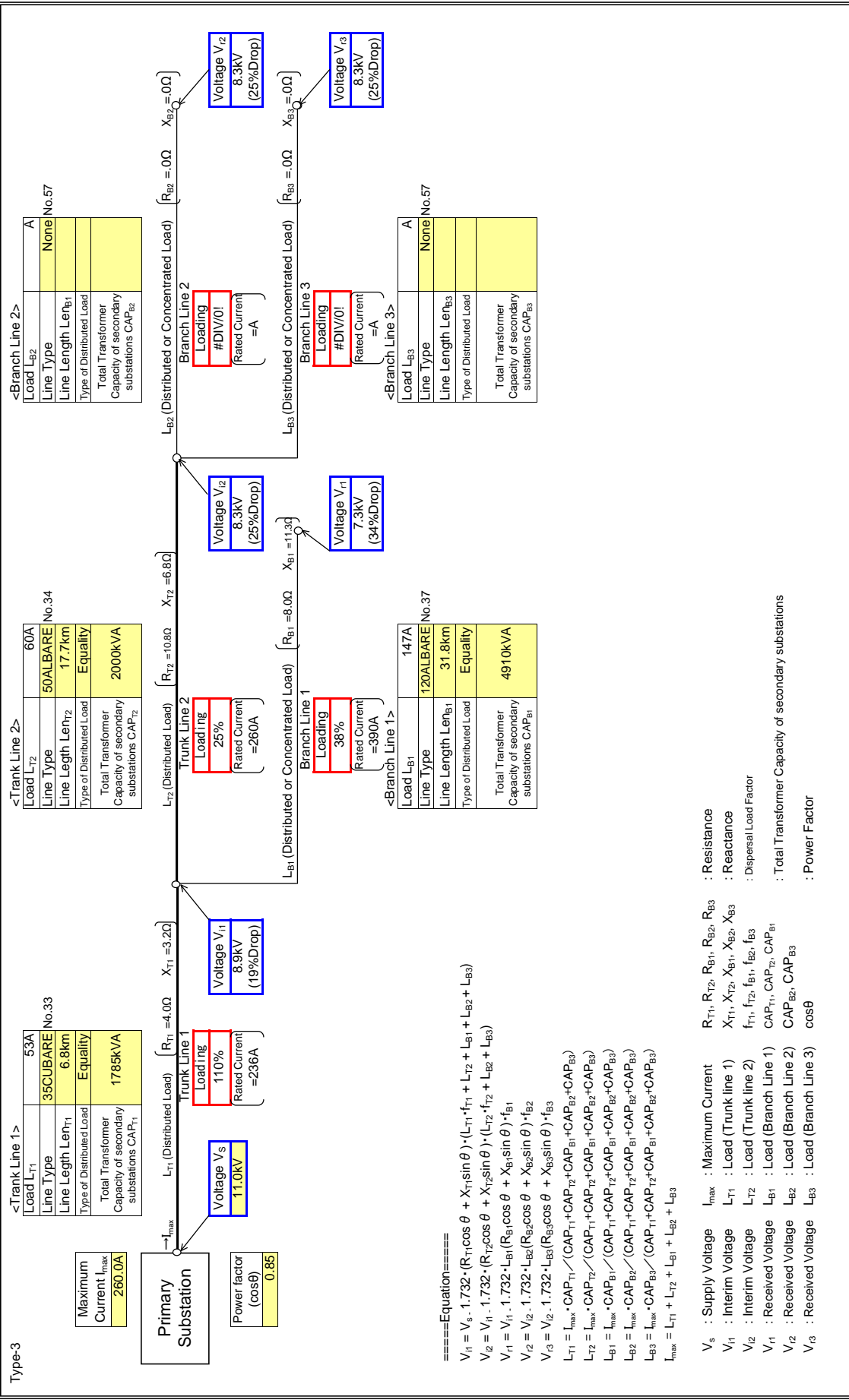
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

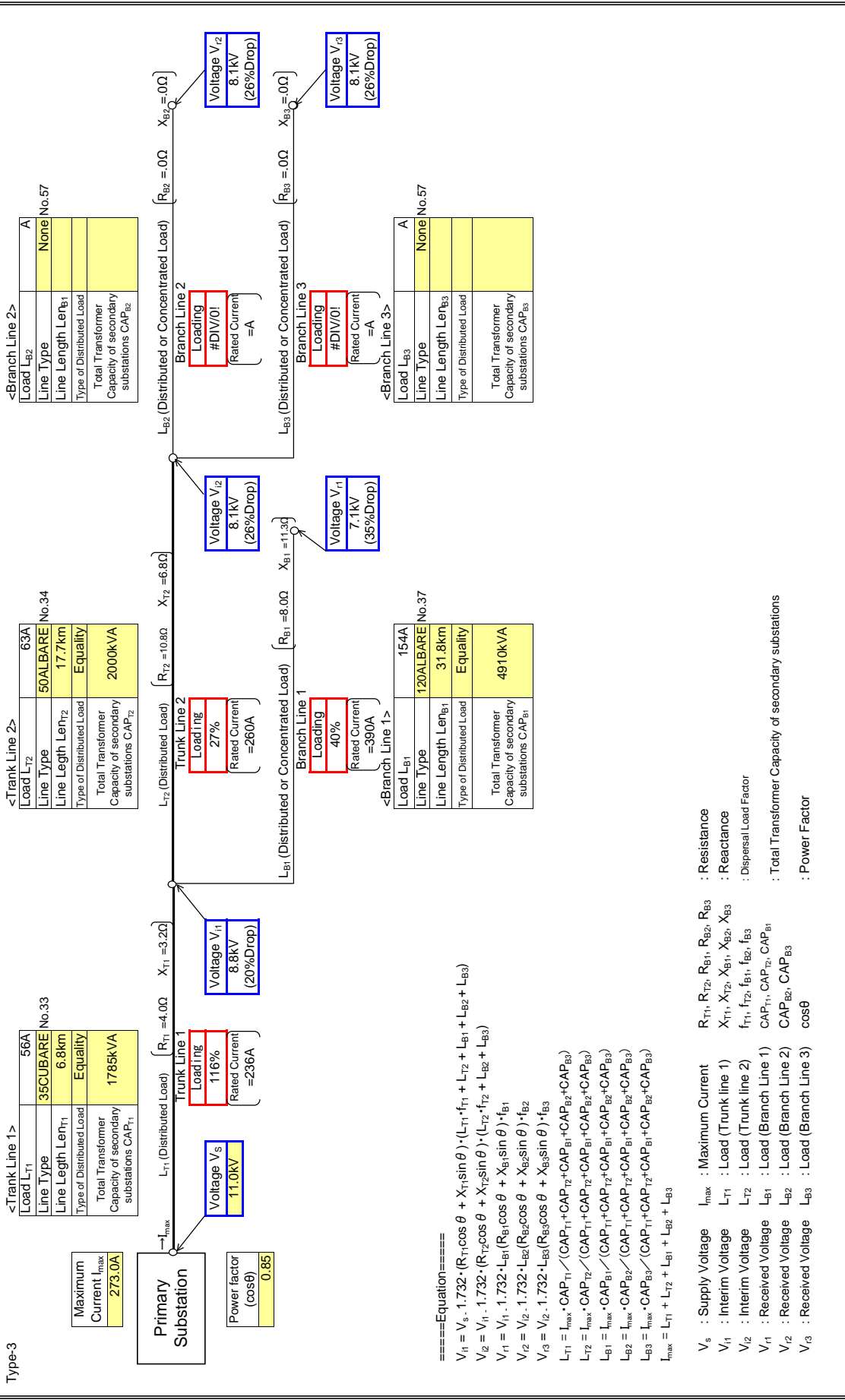
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

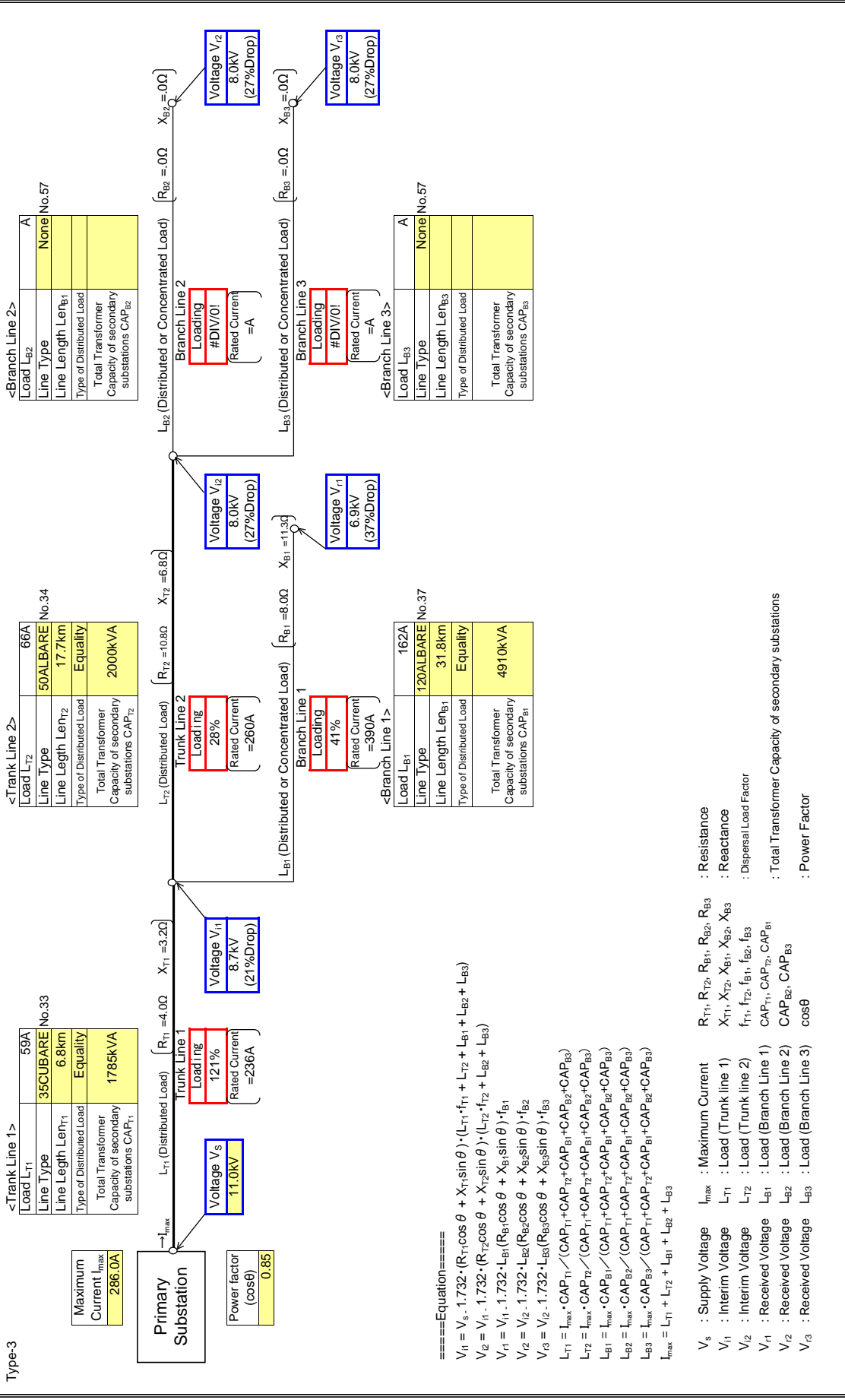
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

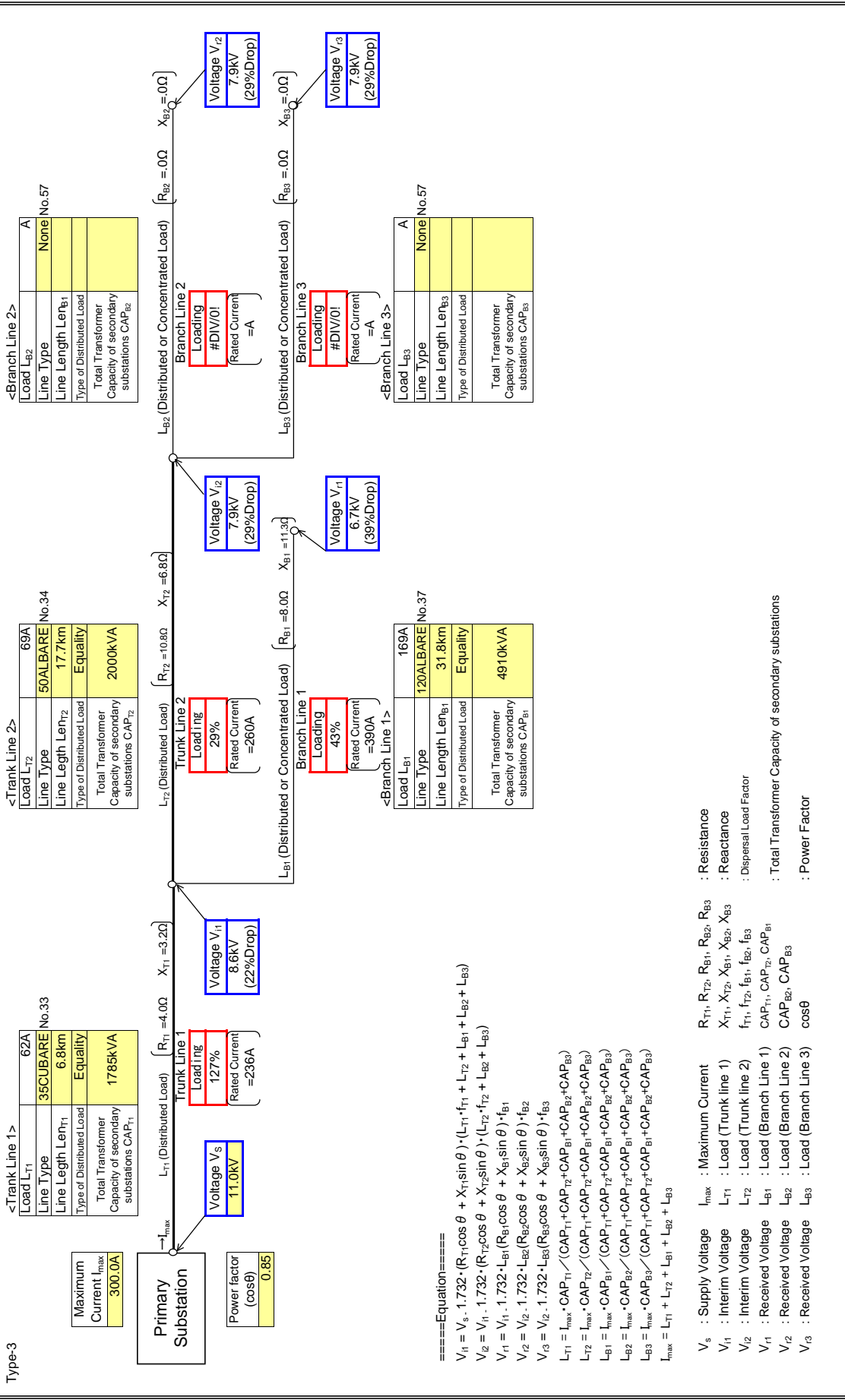
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

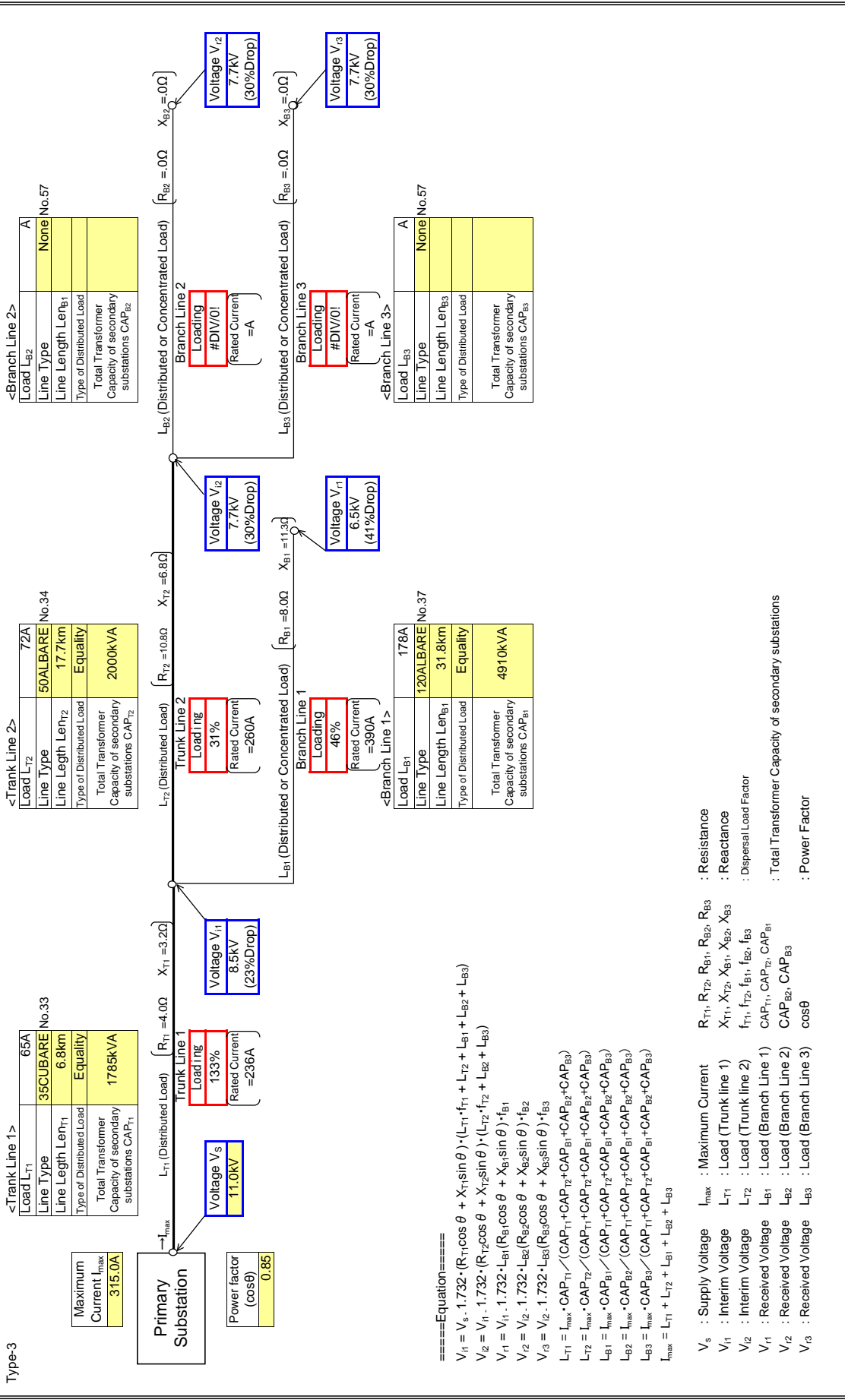
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

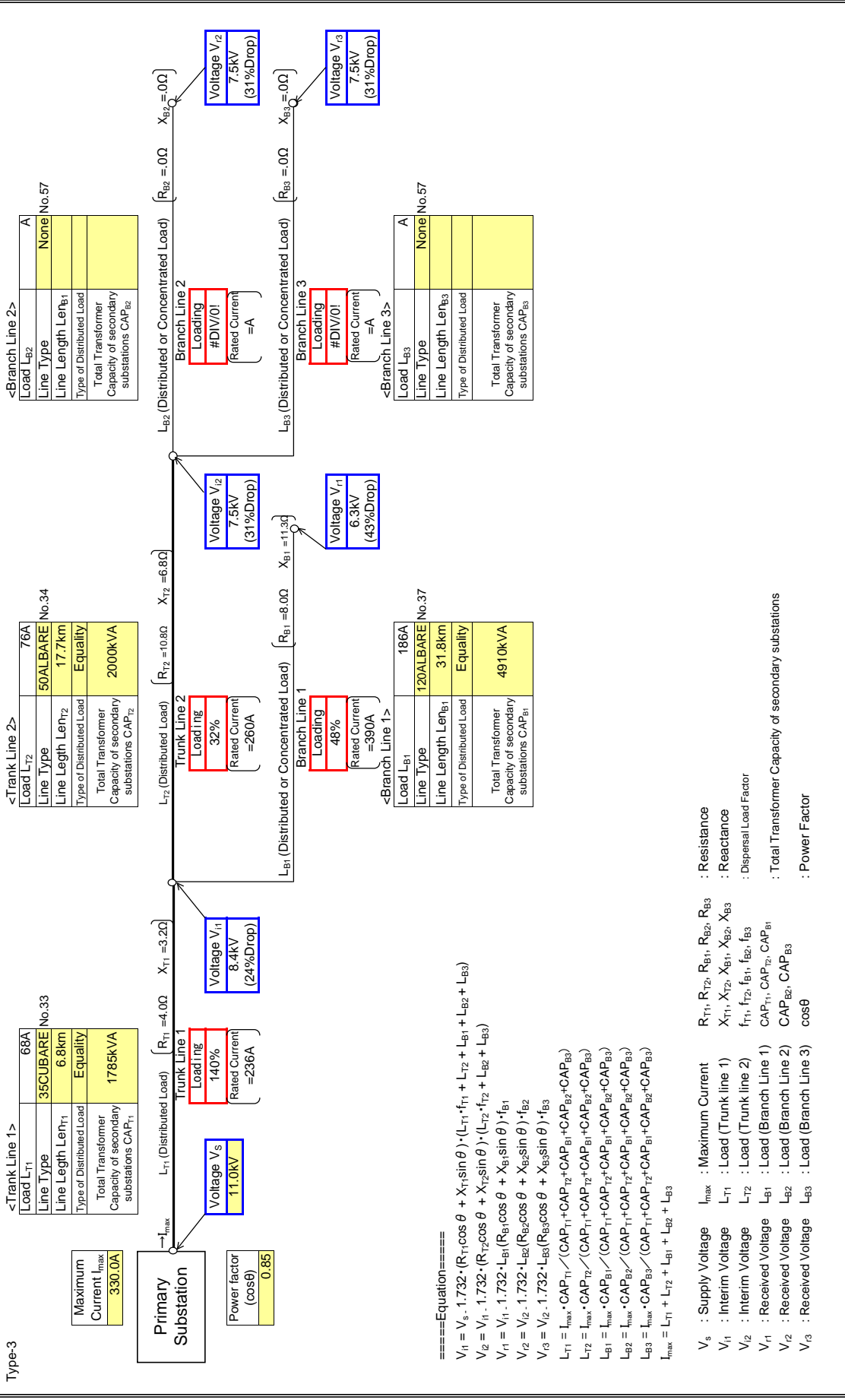
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

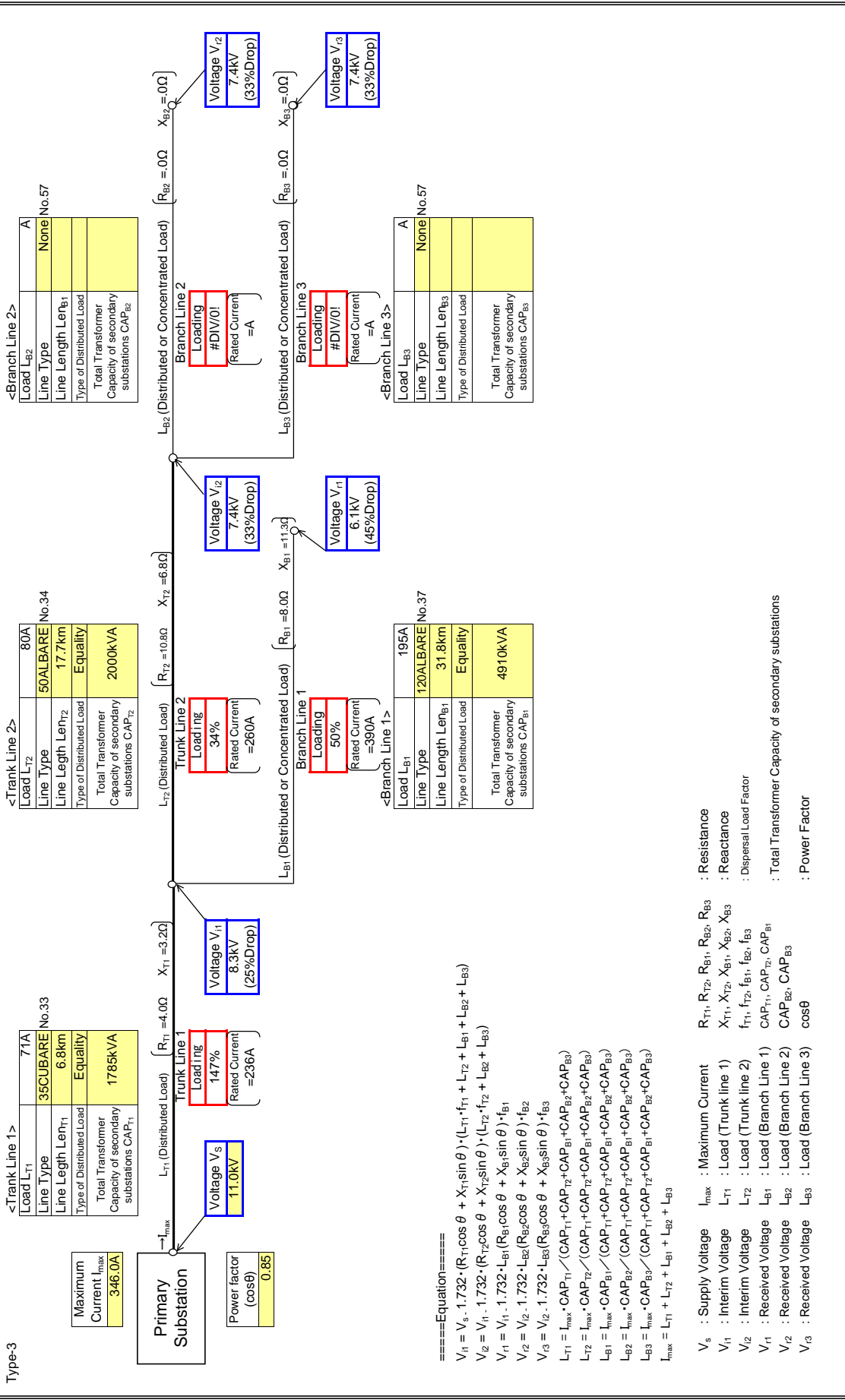
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

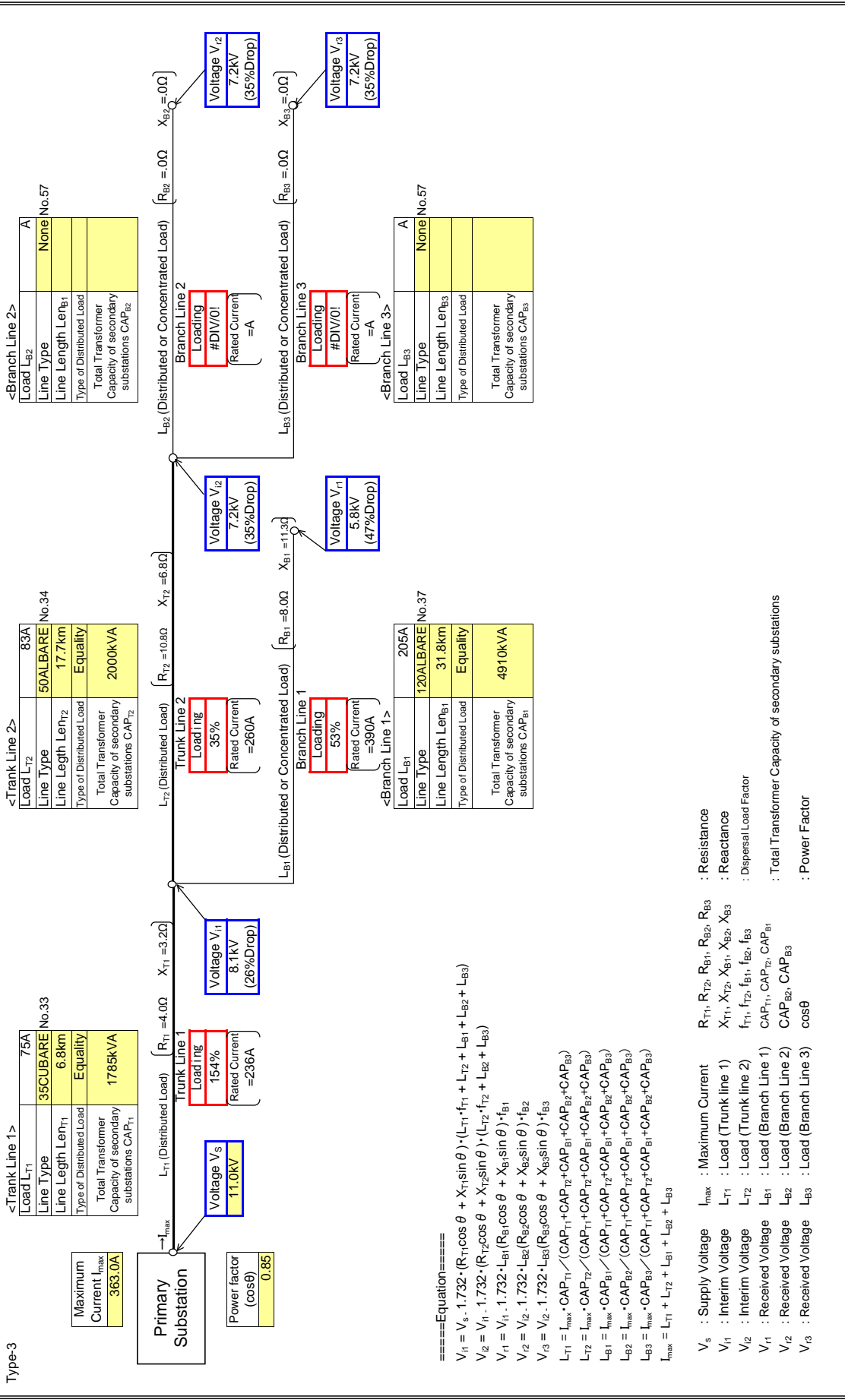
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

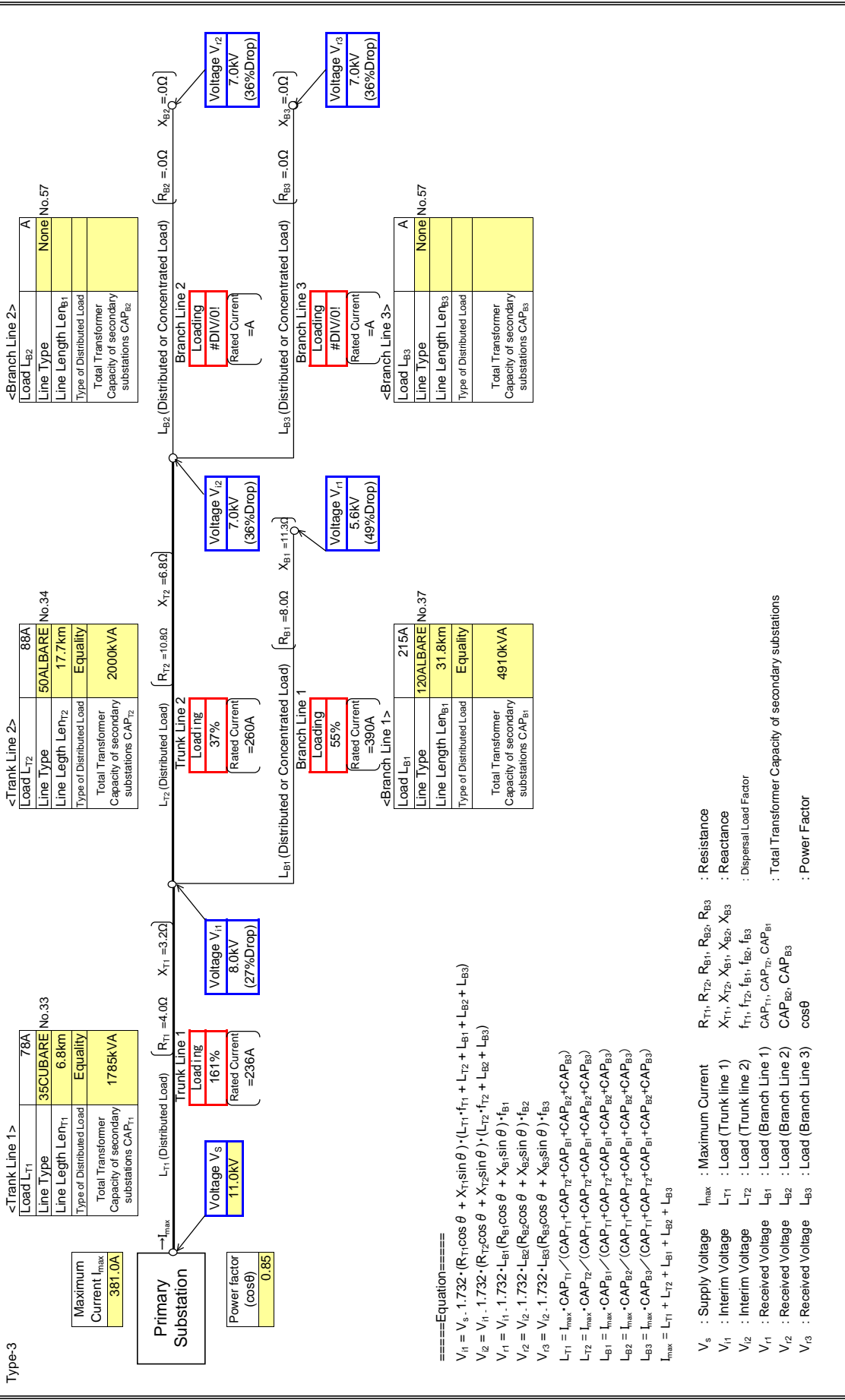
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

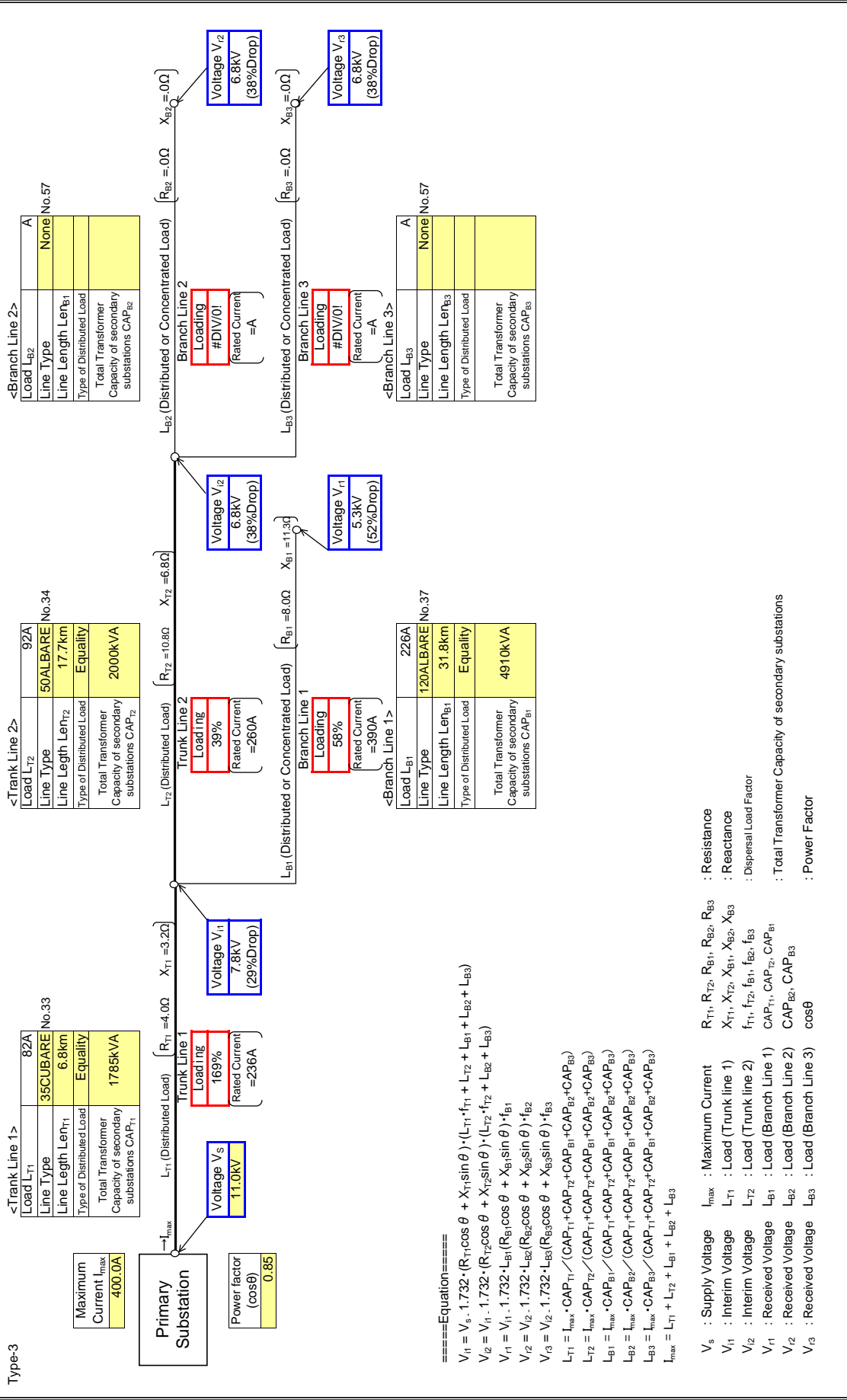
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

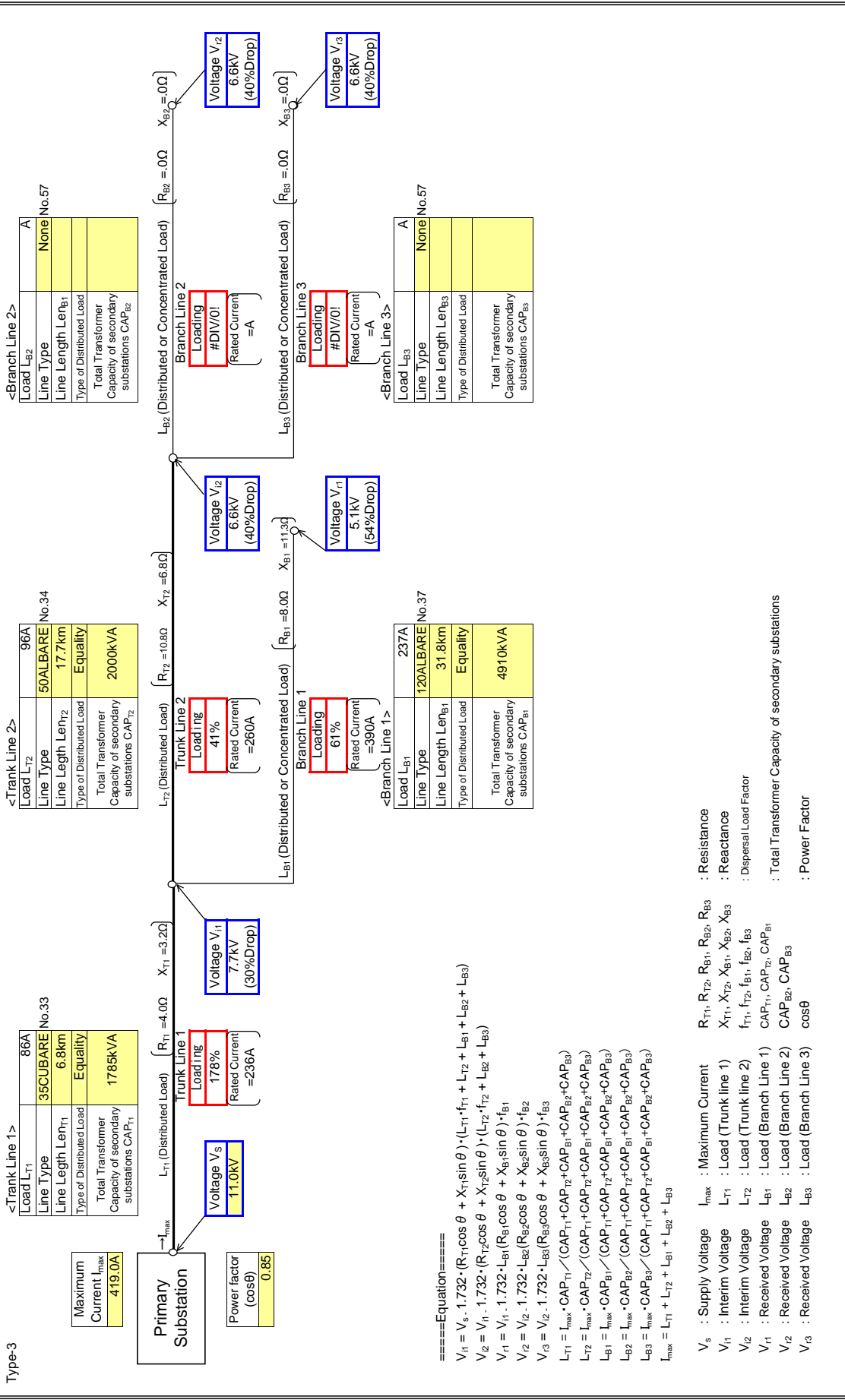
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

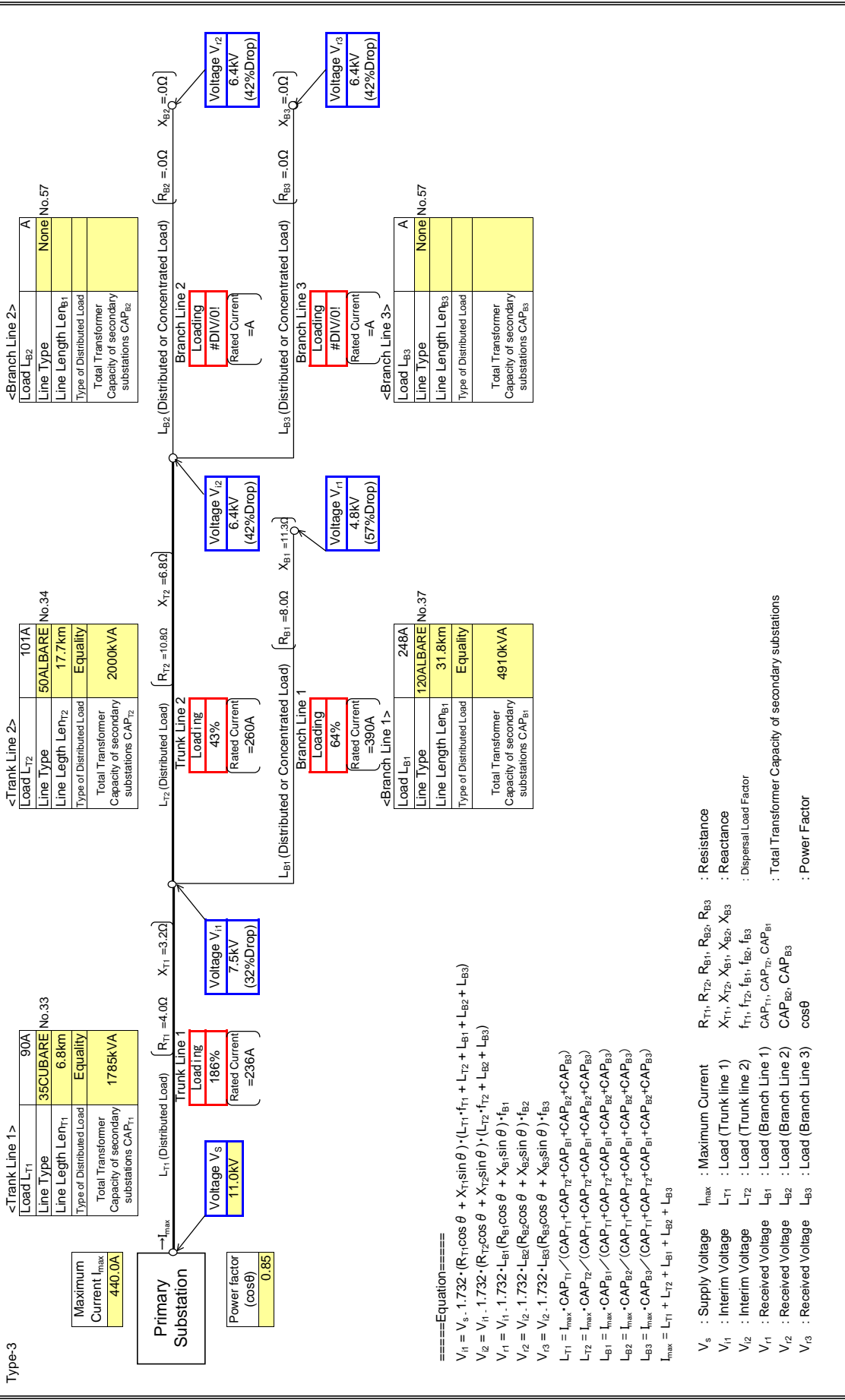
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION N
Feeder Name	NSAWAM-ACCRA

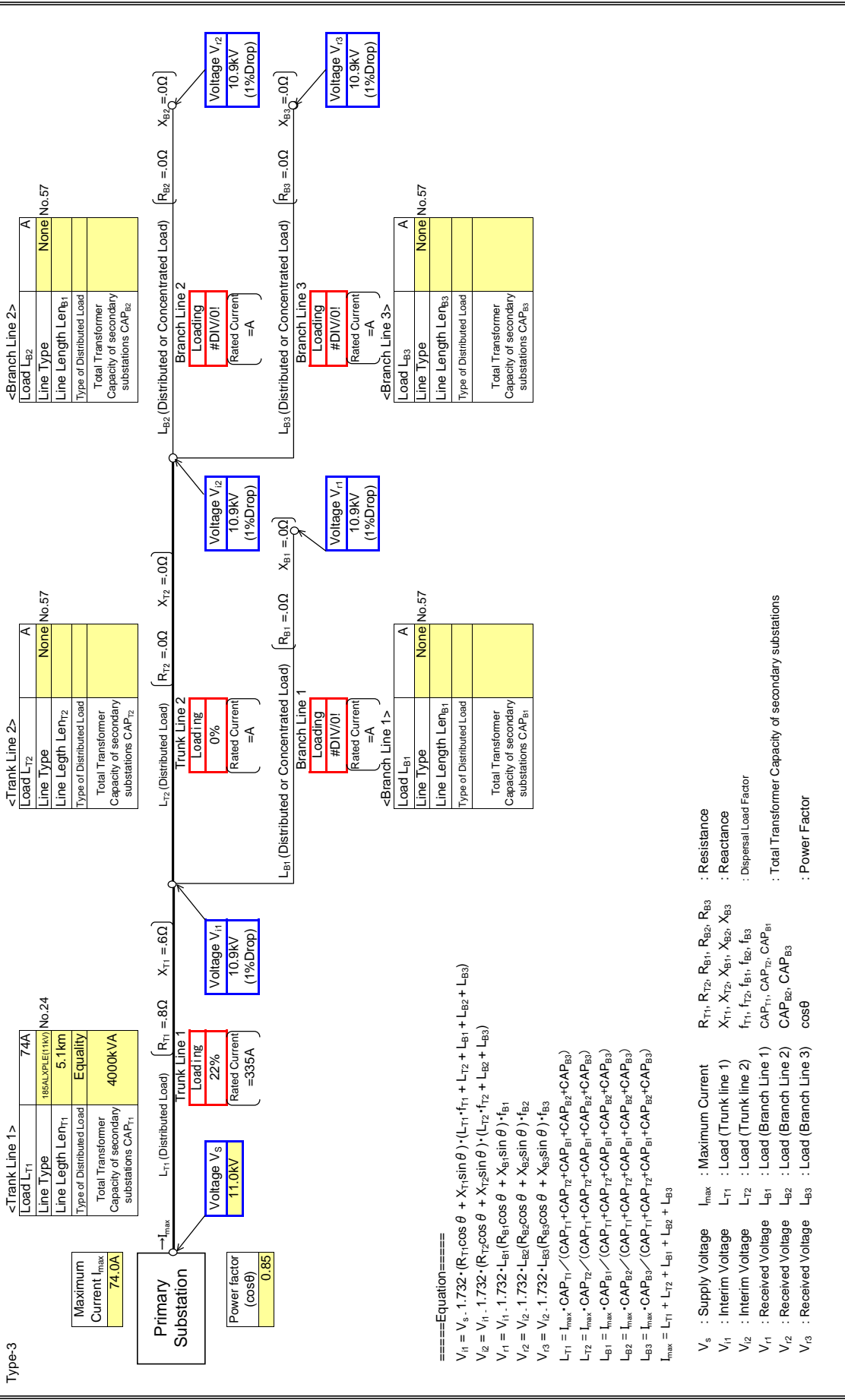
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

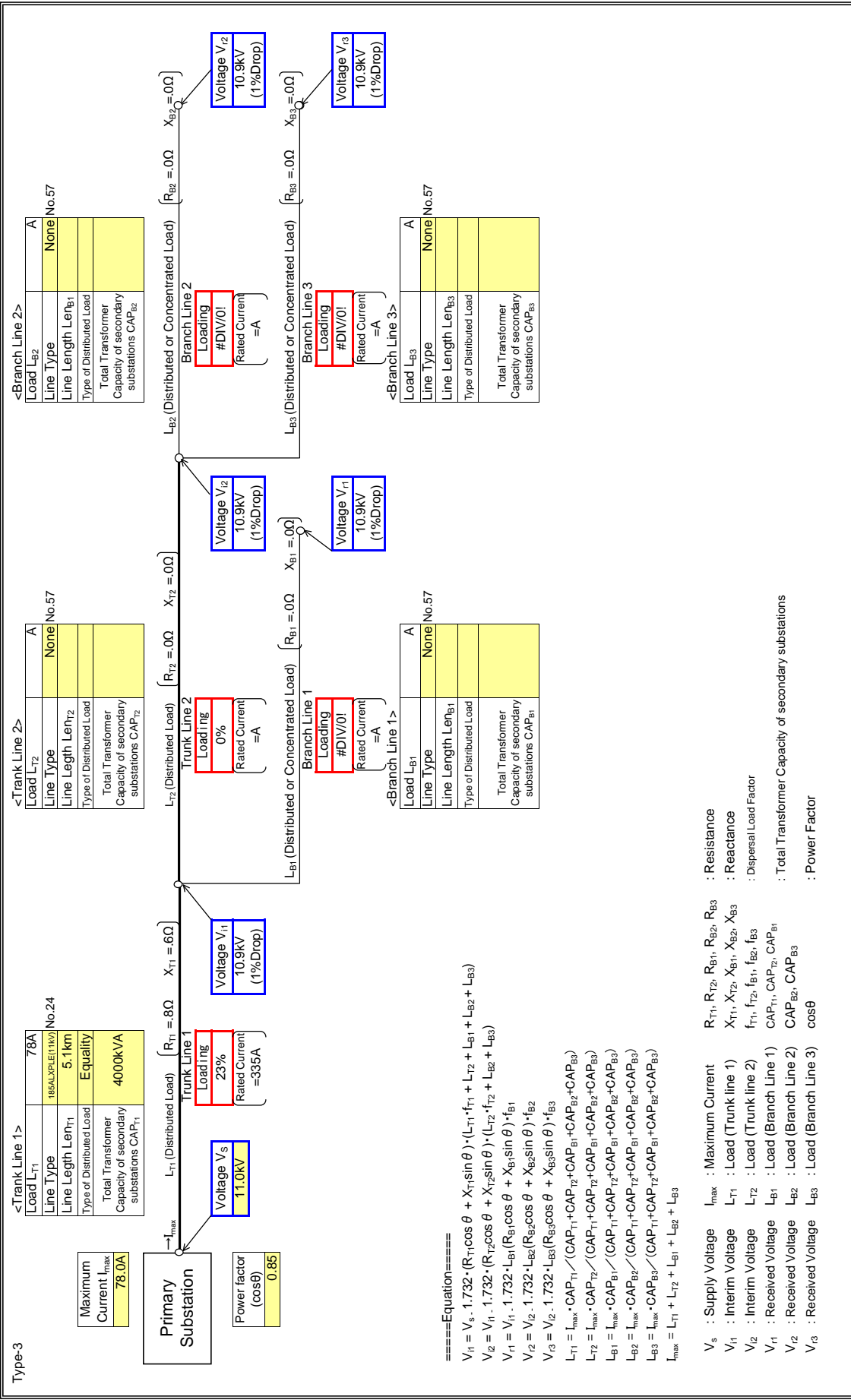
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

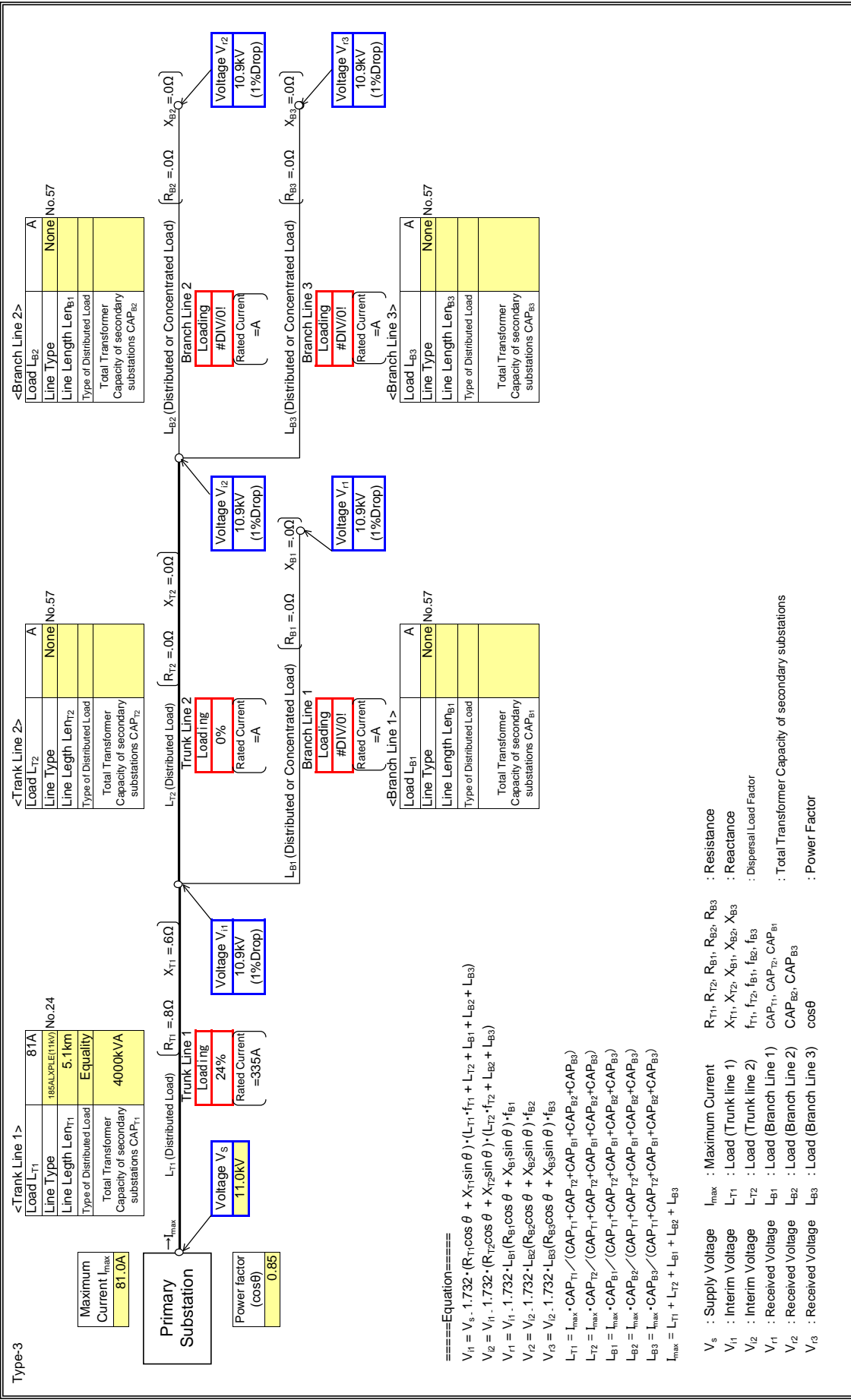
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

Type-3 : Input data in colored cells



<Branch Line 2>

Load L _{B2}	A
Line Type	None
Line Length Le _{B2}	No.57
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{B2}	

<Trunk Line 2>

Load L _{T2}	A
Line Type	None
Line Length Le _{T2}	No.57
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{T2}	

<Trunk Line 1>

Load L _{T1}	81A
Line Type	185ALXPLE(11KV)
Line Length Le _{T1}	5.1km
Type of Distributed Load	Equality
Total Transformer Capacity of secondary substations CAP _{T1}	4000kVA

<Branch Line 2>

Line Type	None
Line Length Le _{B1}	
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{B1}	

<Branch Line 1>

Line Type	A
Line Length Le _{B1}	
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{B1}	

<Branch Line 1>

Line Type	A
Line Length Le _{B1}	
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{B1}	

Primary Substation

Maximum Current I _{max}	81.0A
Power factor (cosθ)	0.85

====Equation====
 $V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{L2} = V_{T1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{L1} = V_{T1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{L2} = V_{L2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{L3} = V_{L2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

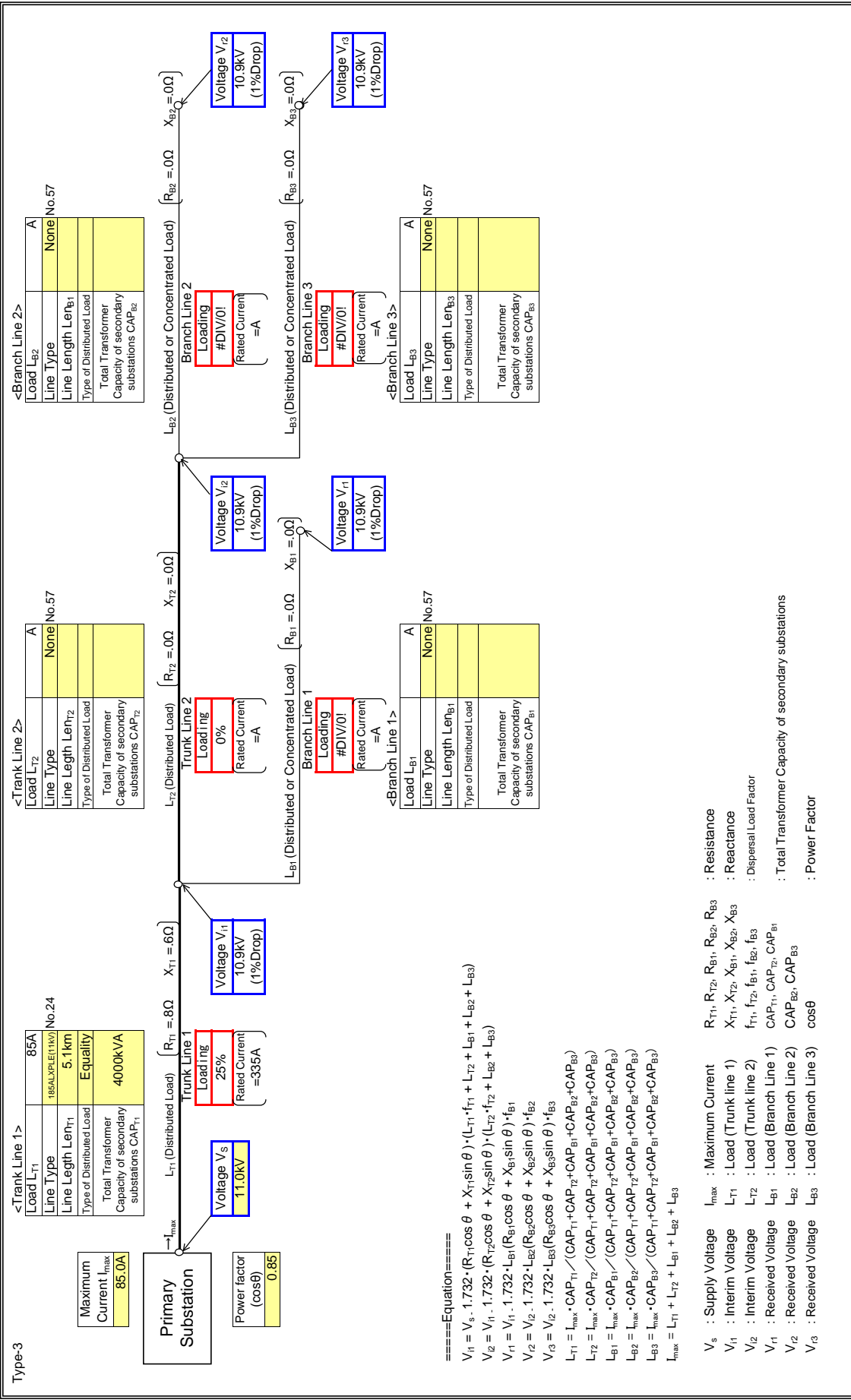
$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

- V_s : Supply Voltage
- I_{max} : Maximum Current
- R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3} : Resistance
- X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3} : Reactance
- f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3} : Dispersal Load Factor
- CAP_{T1}, CAP_{T2}, CAP_{B1} : Total Transformer Capacity of secondary substations
- CAP_{B2}, CAP_{B3} : Power Factor
- cosθ : Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

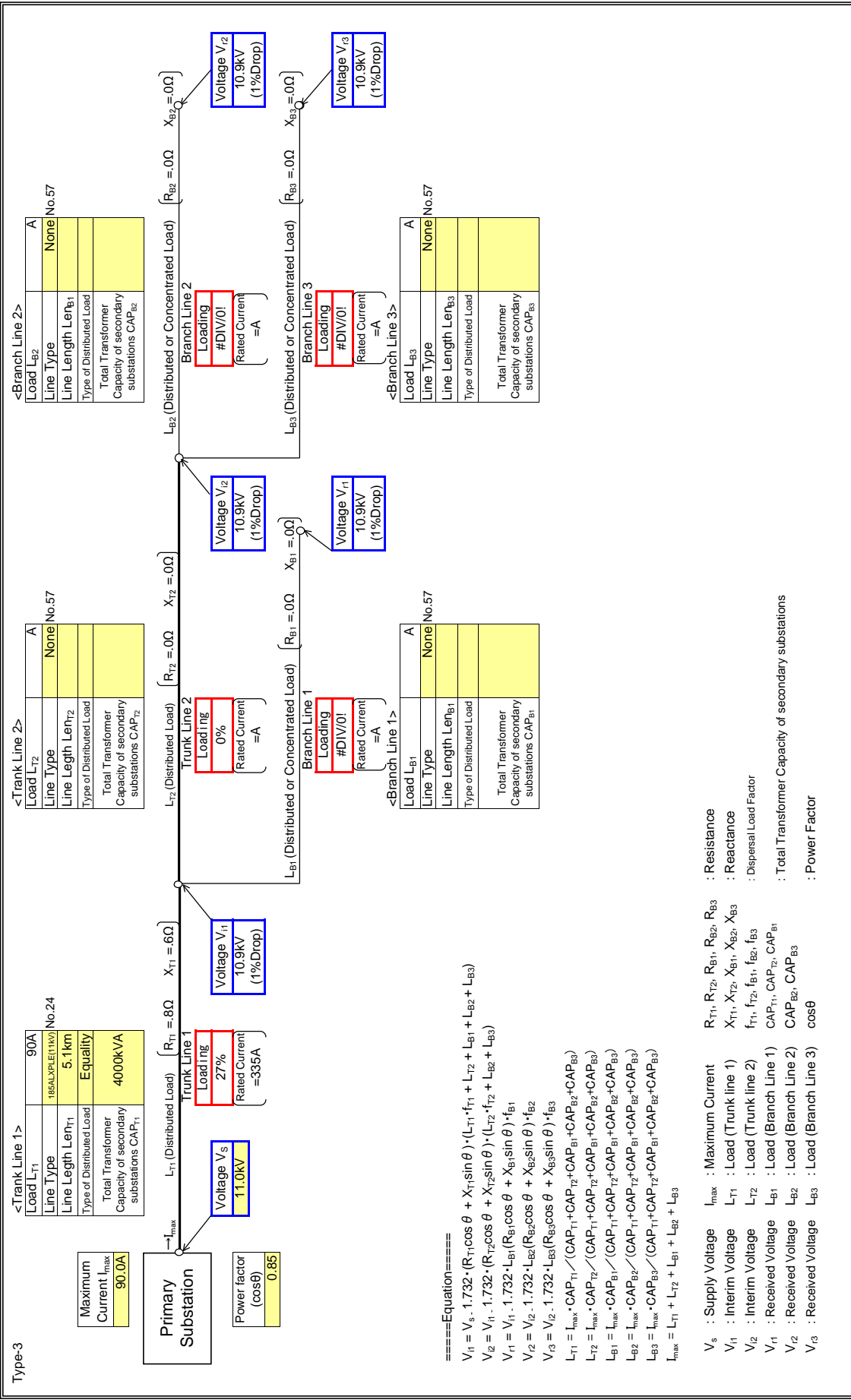
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

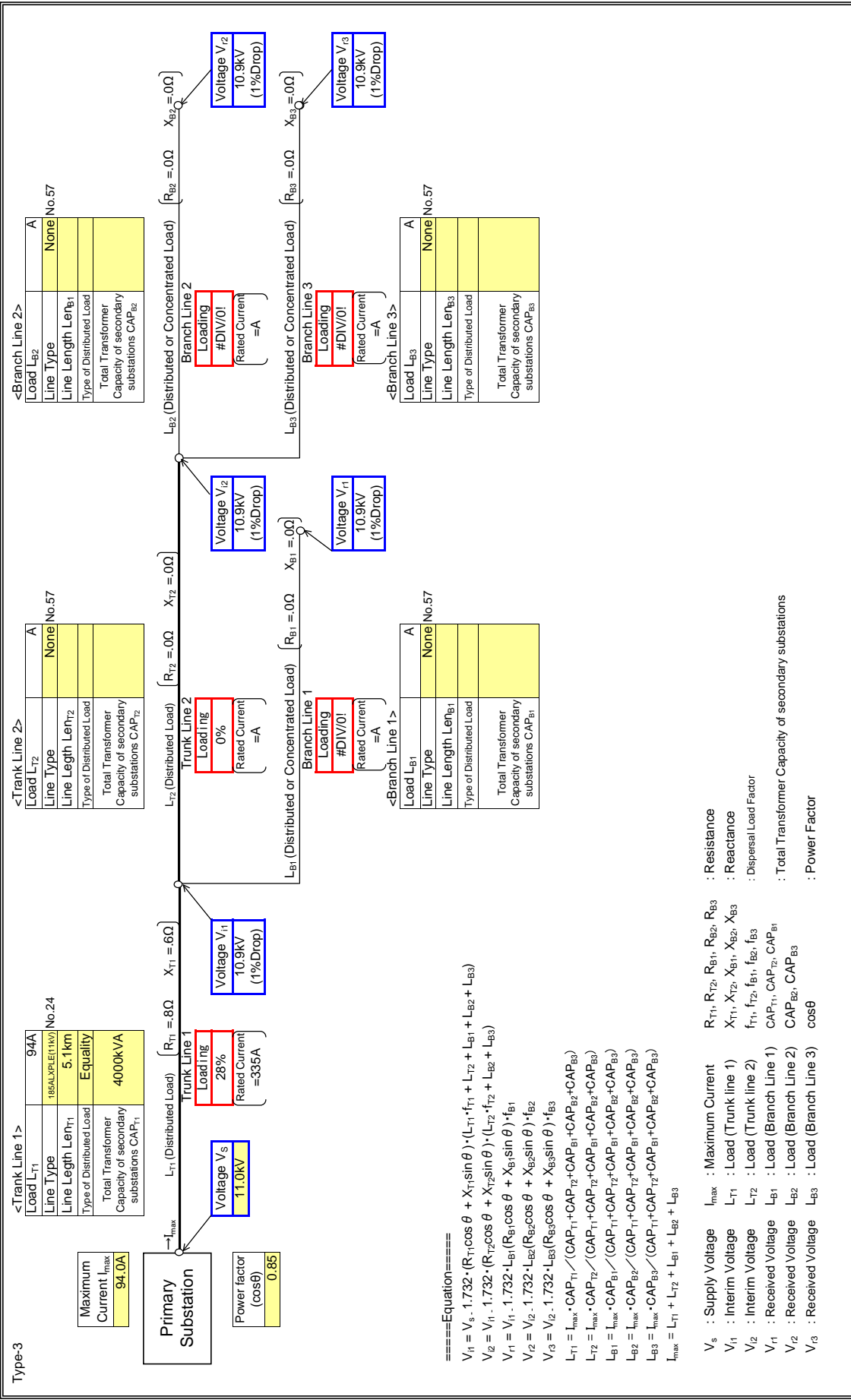
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

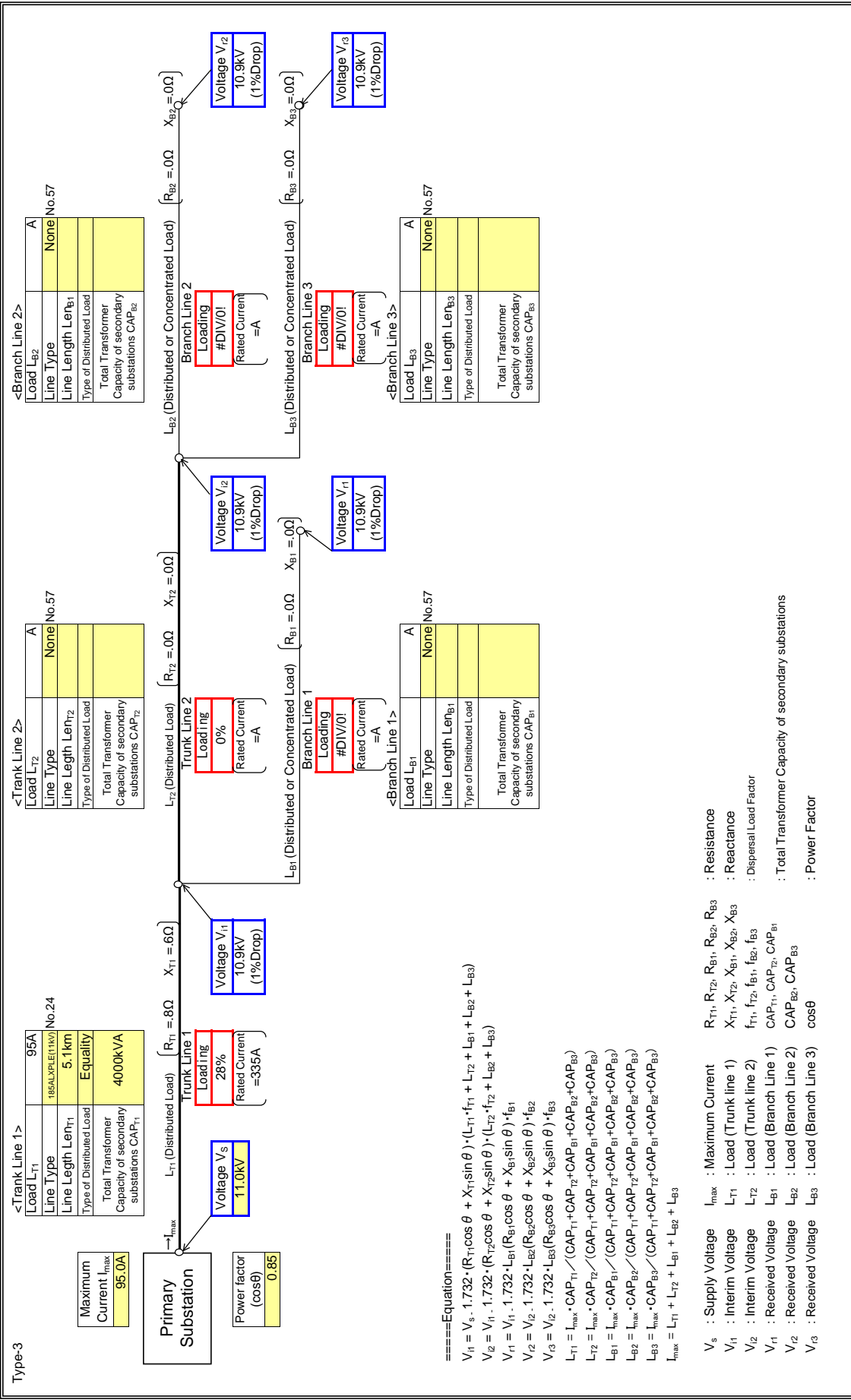
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

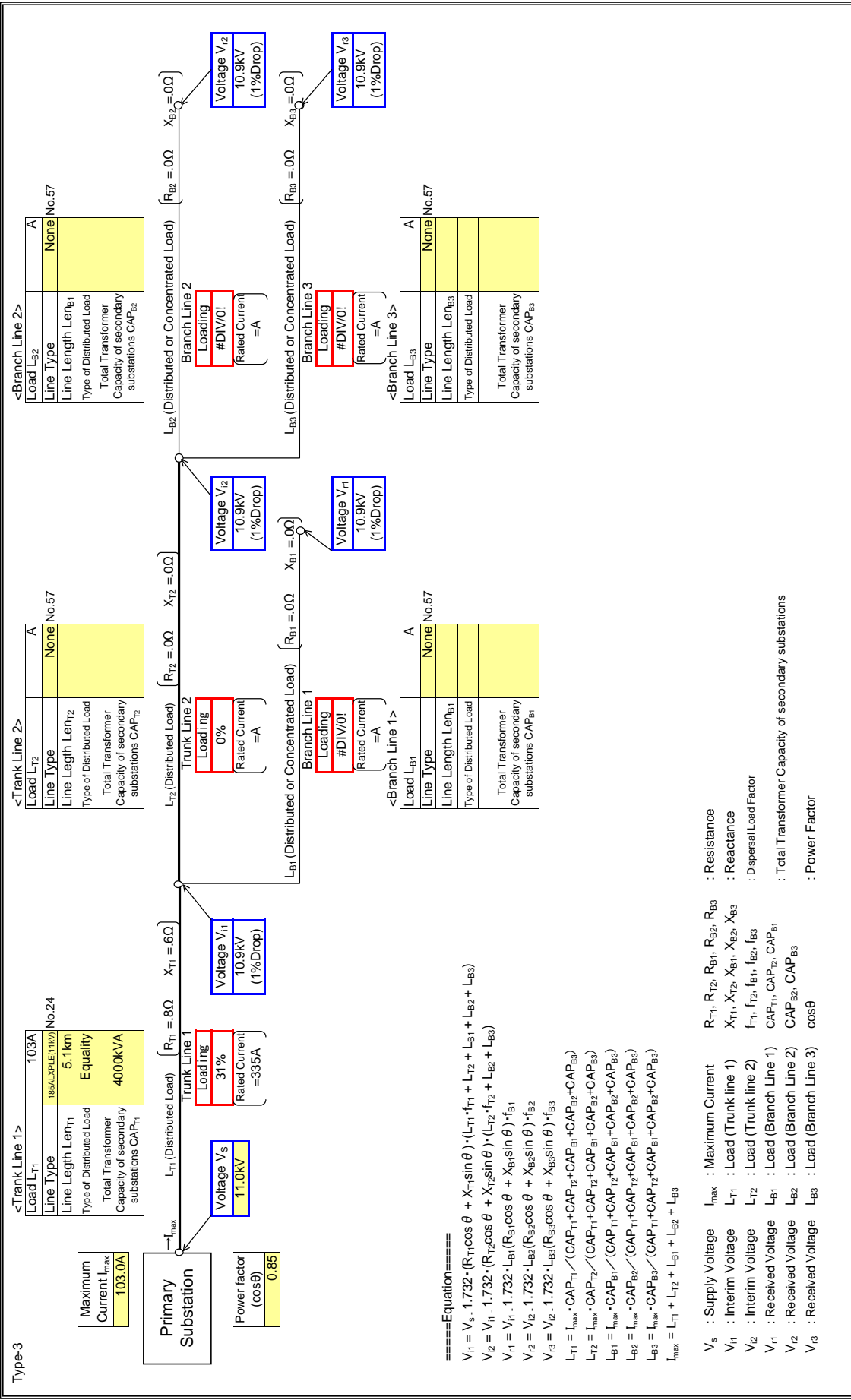
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

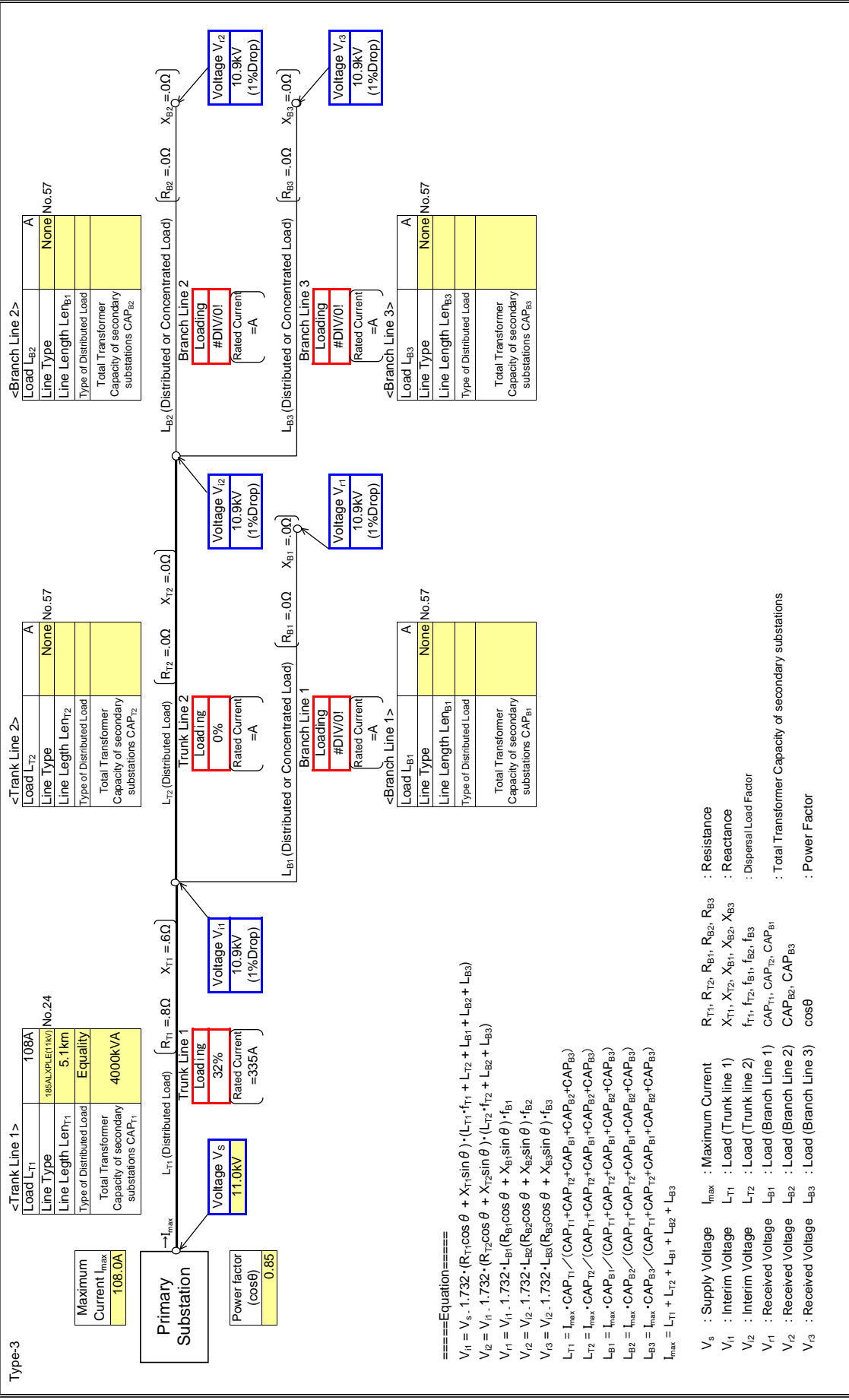
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

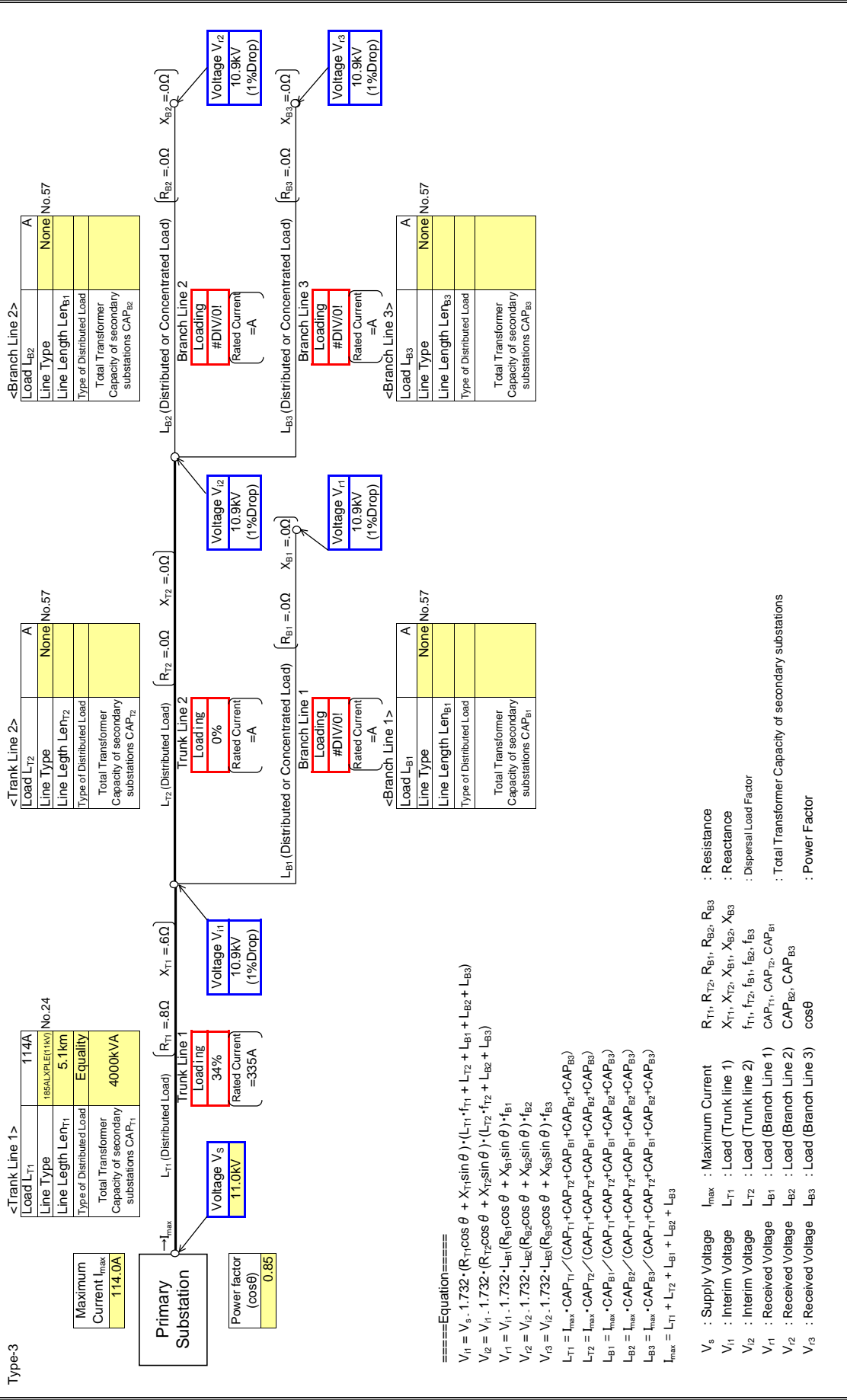
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

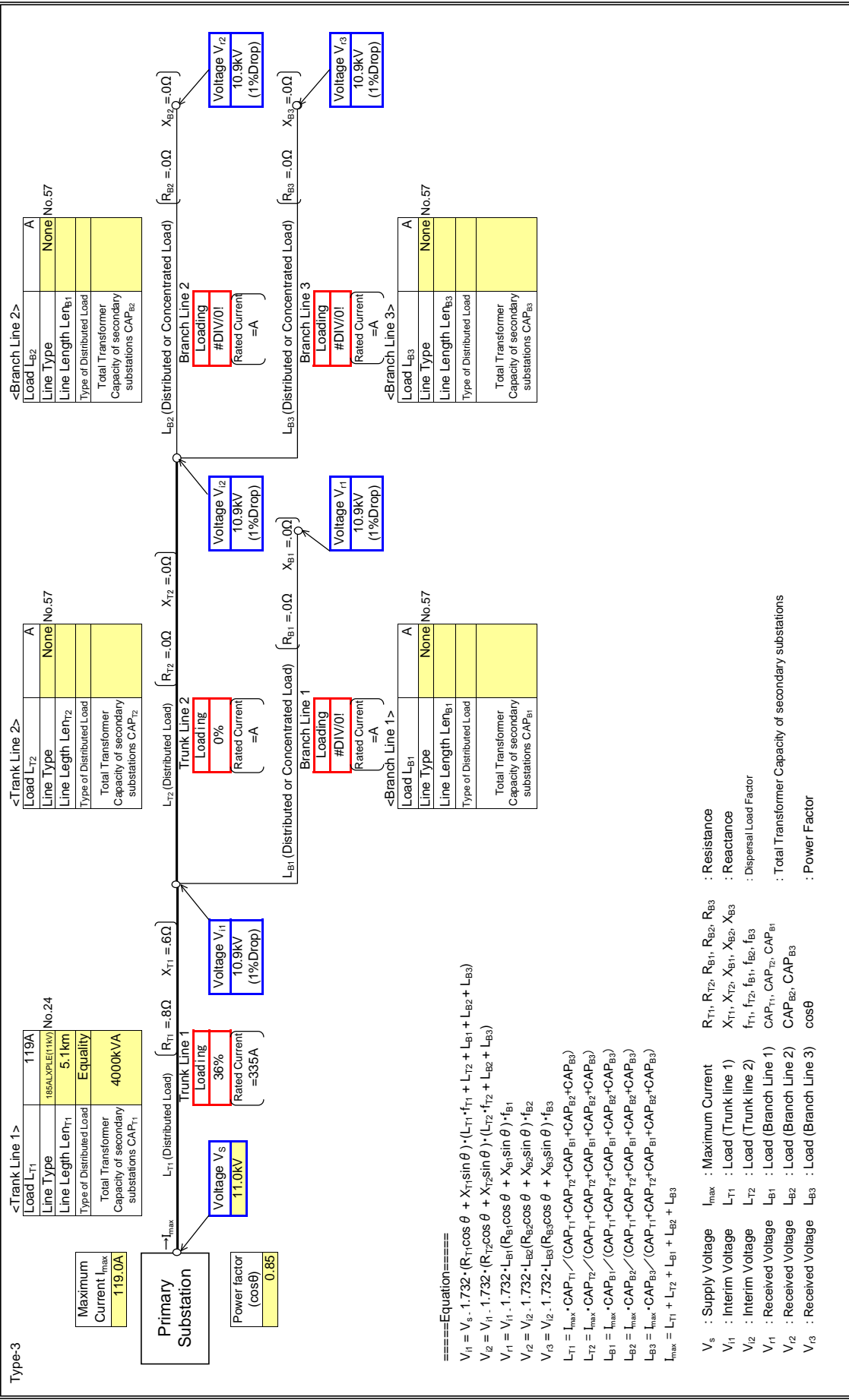
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

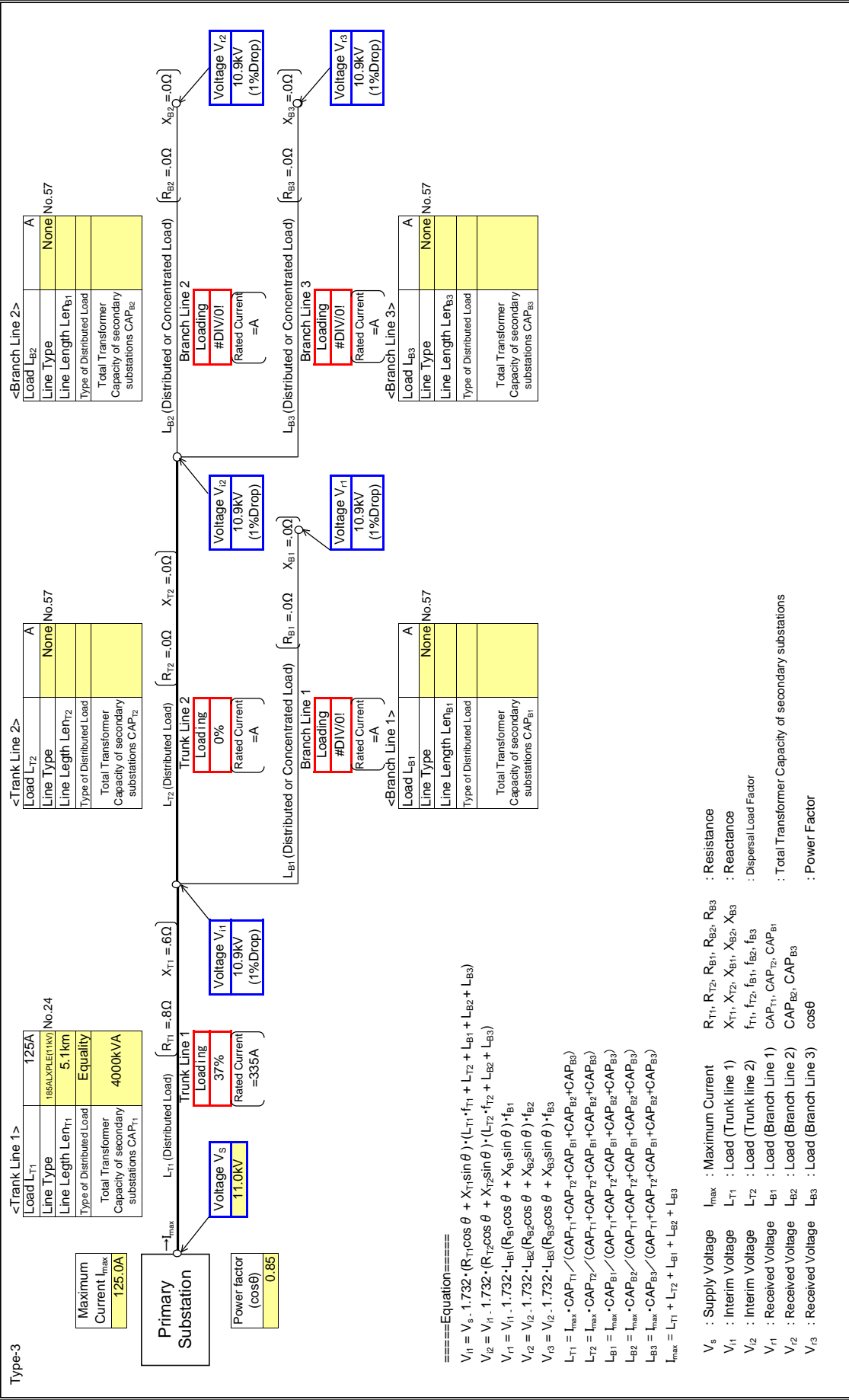
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R10

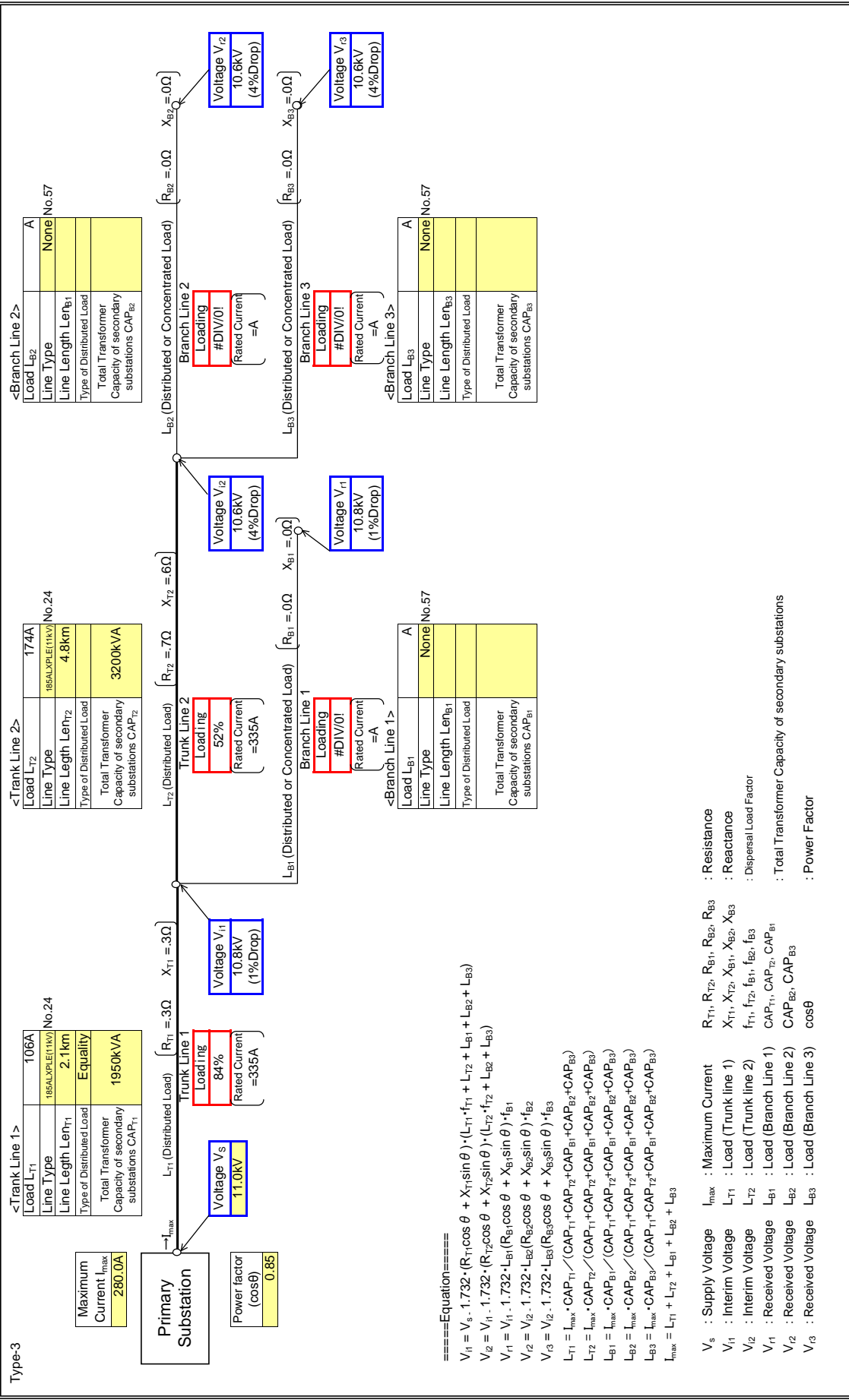
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

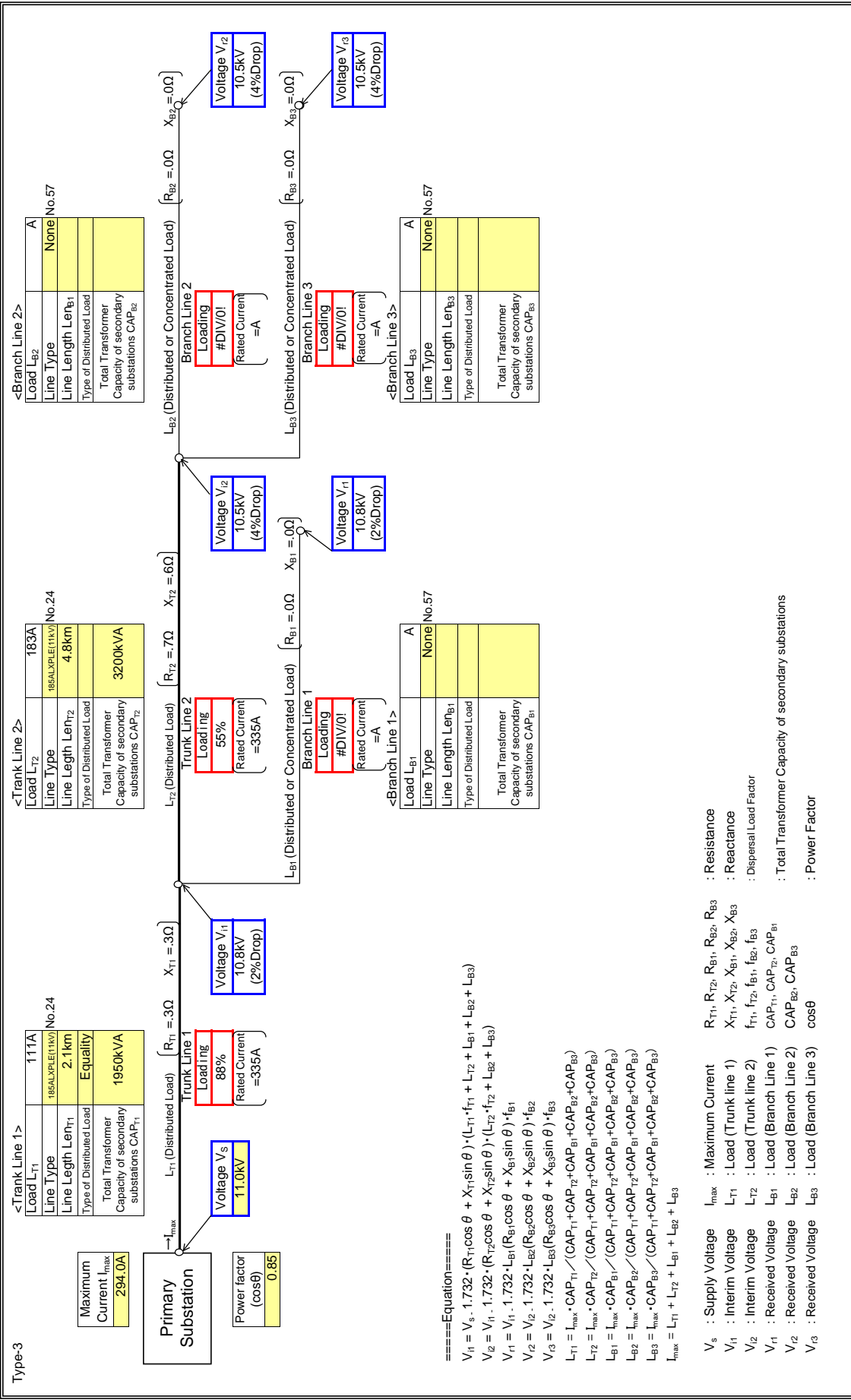
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

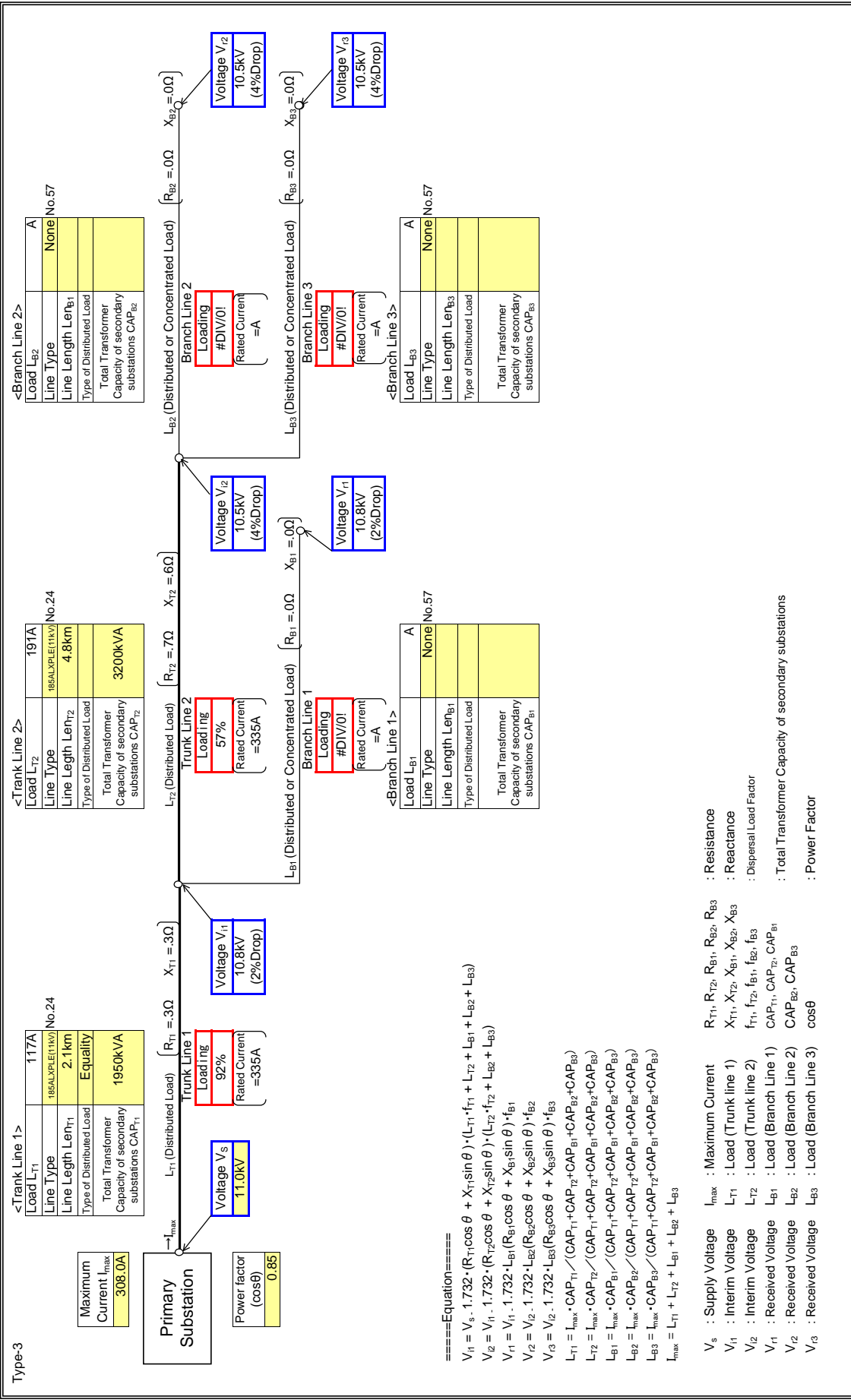
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

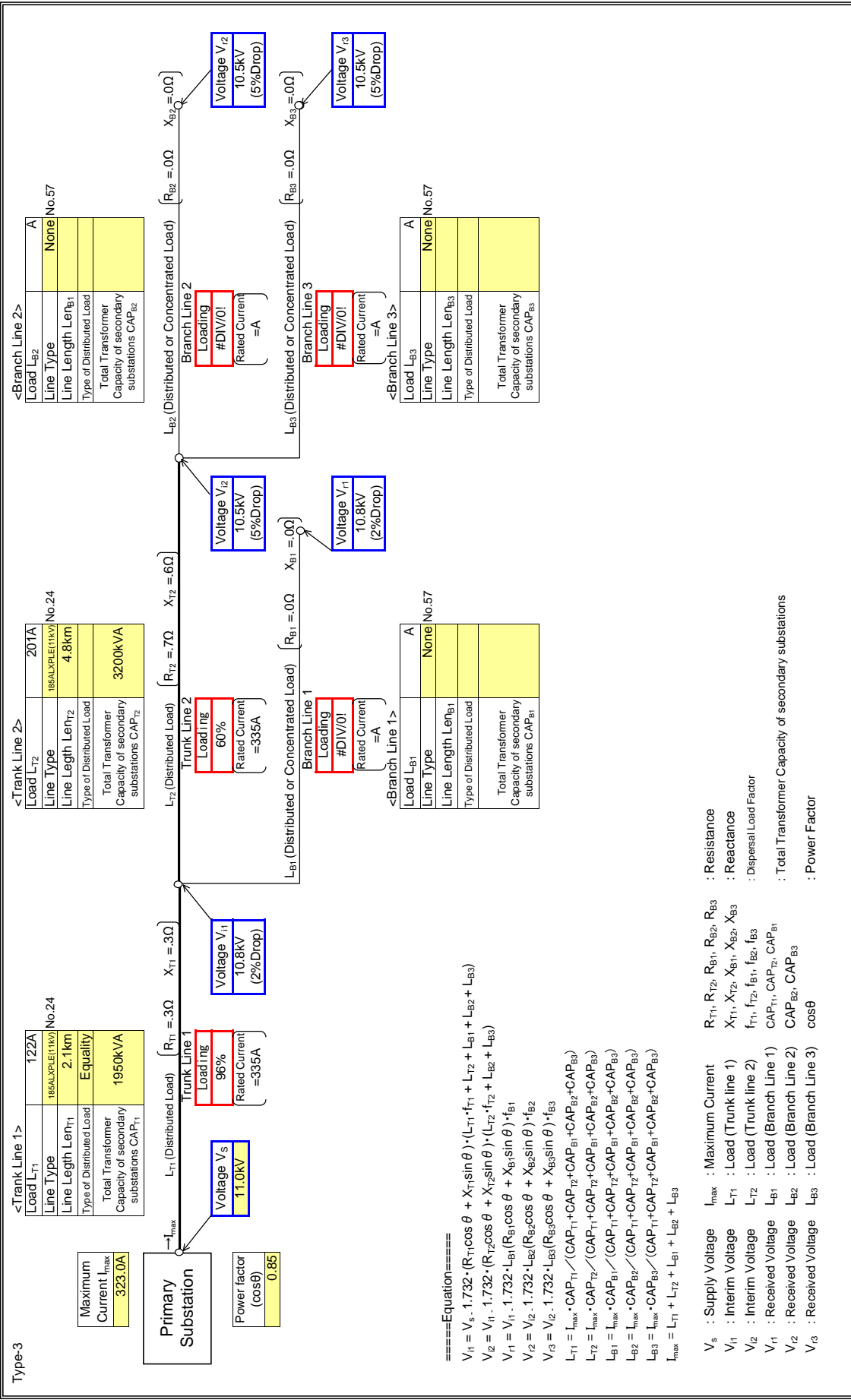
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

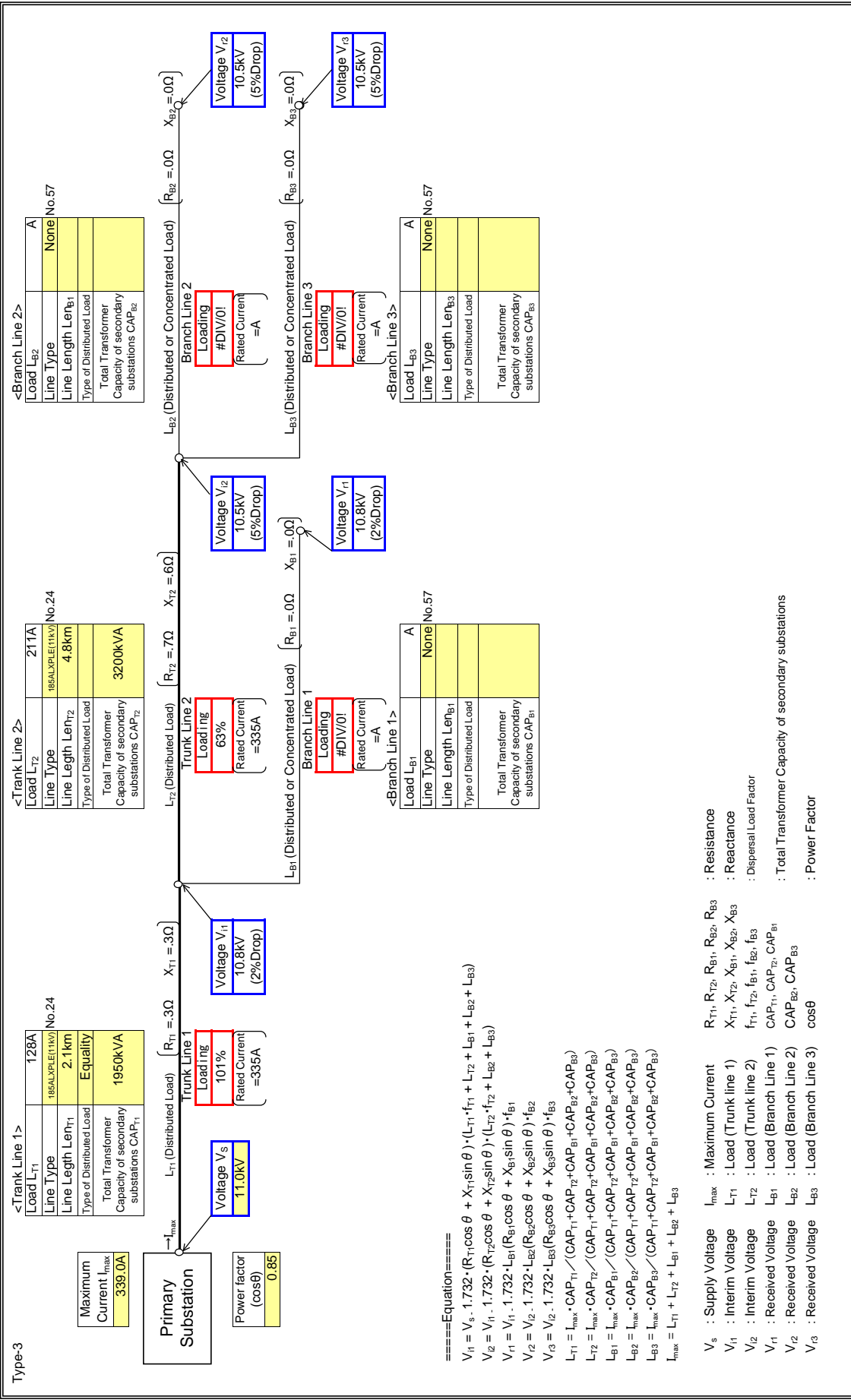
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

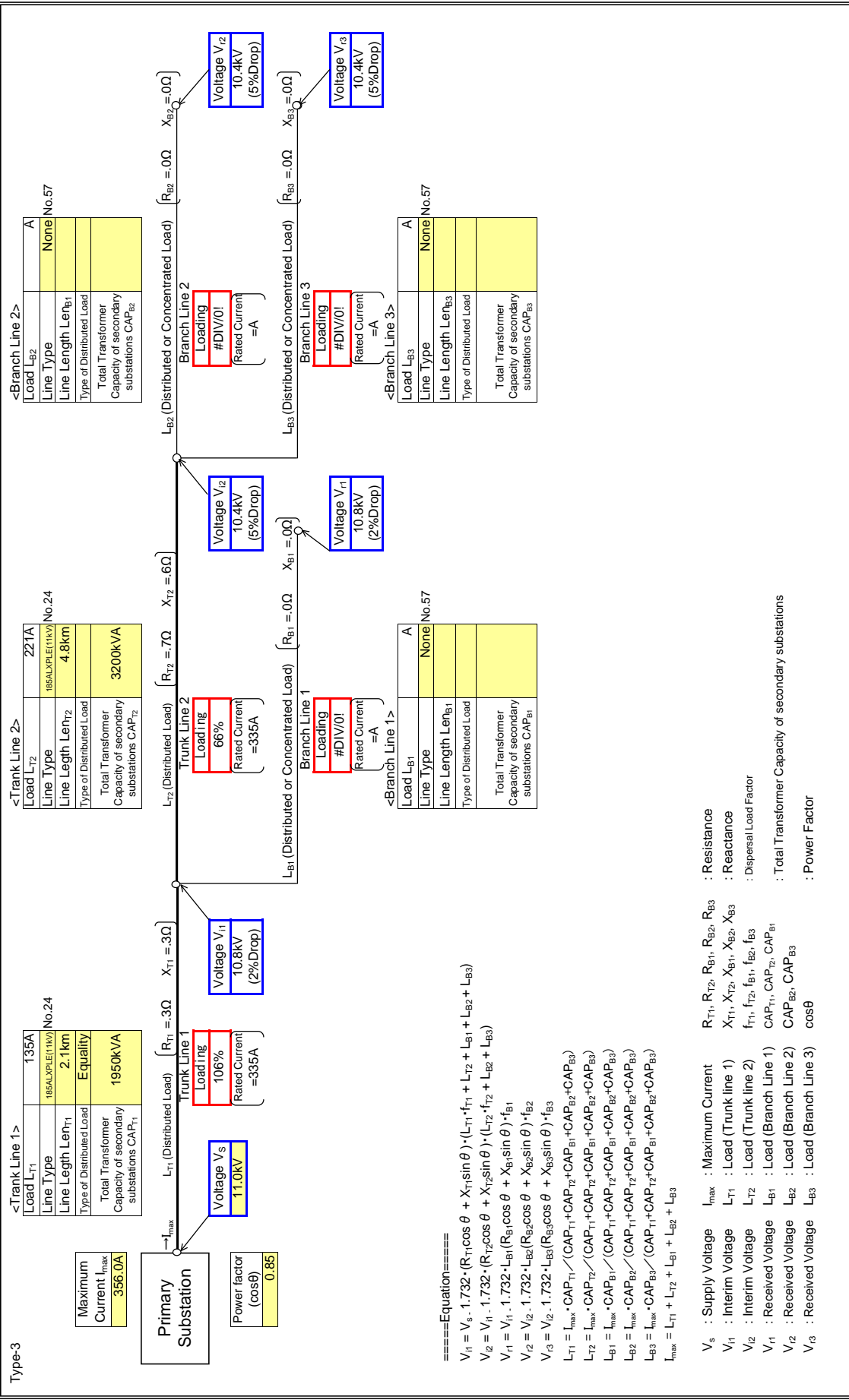
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

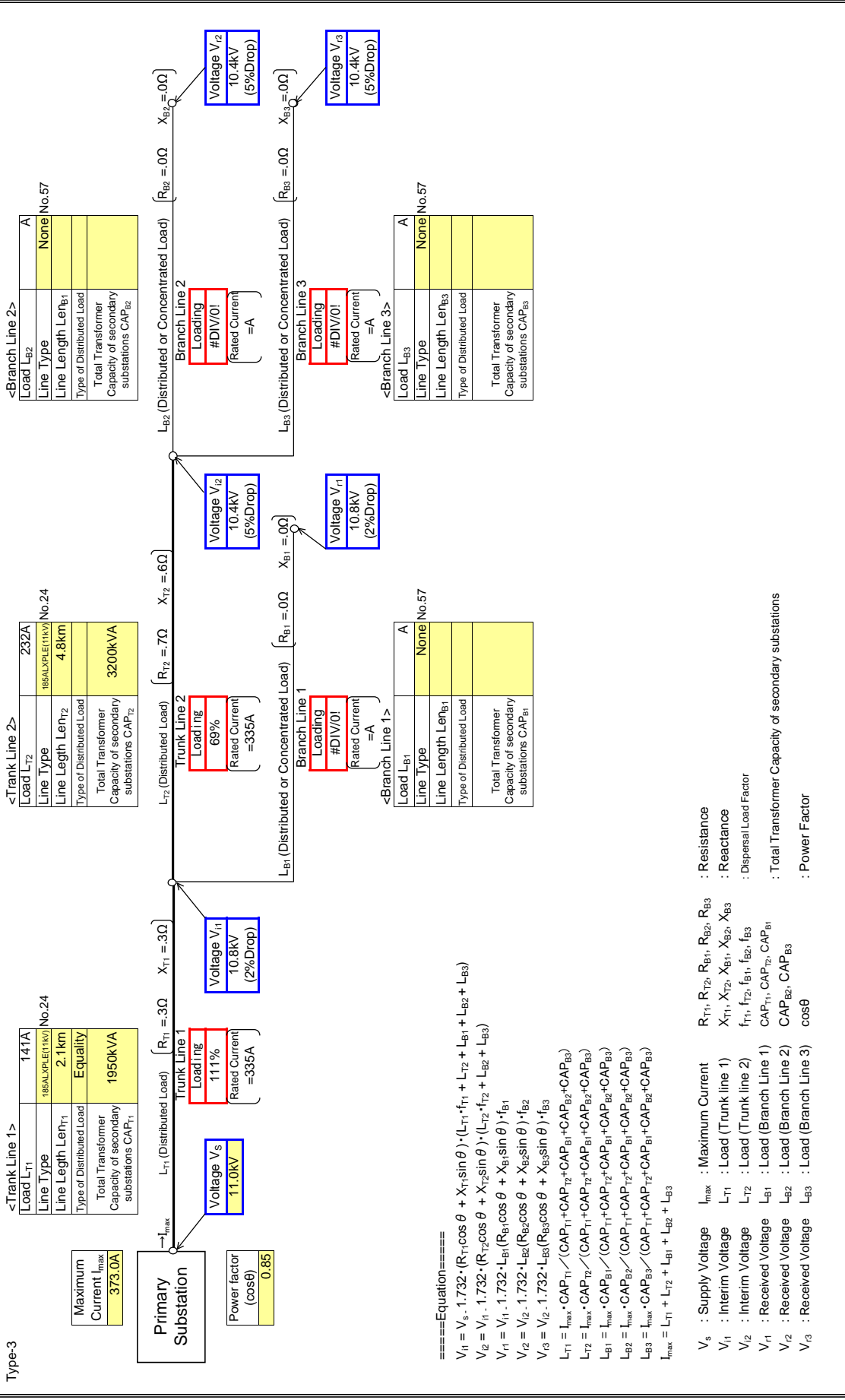
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

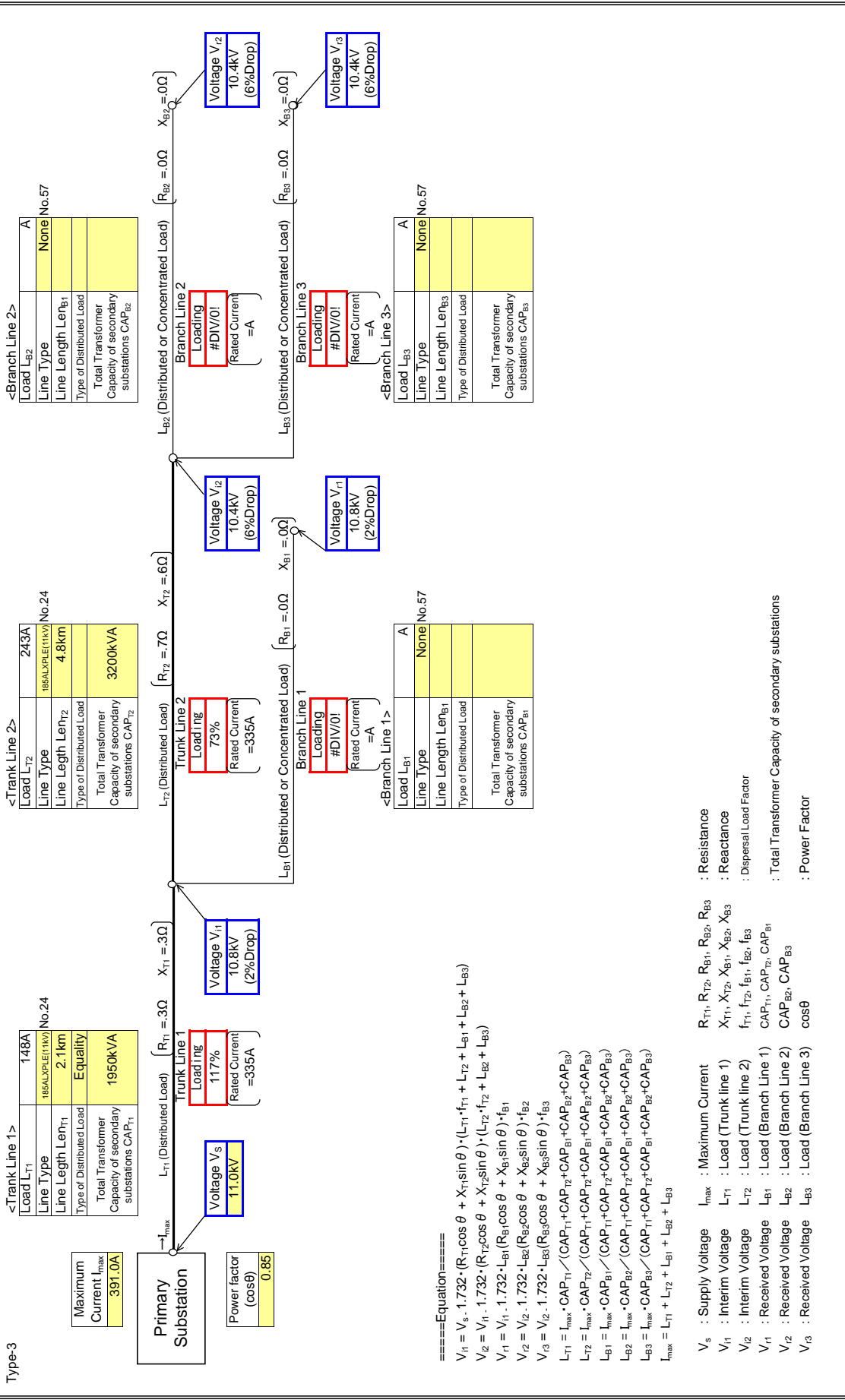
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

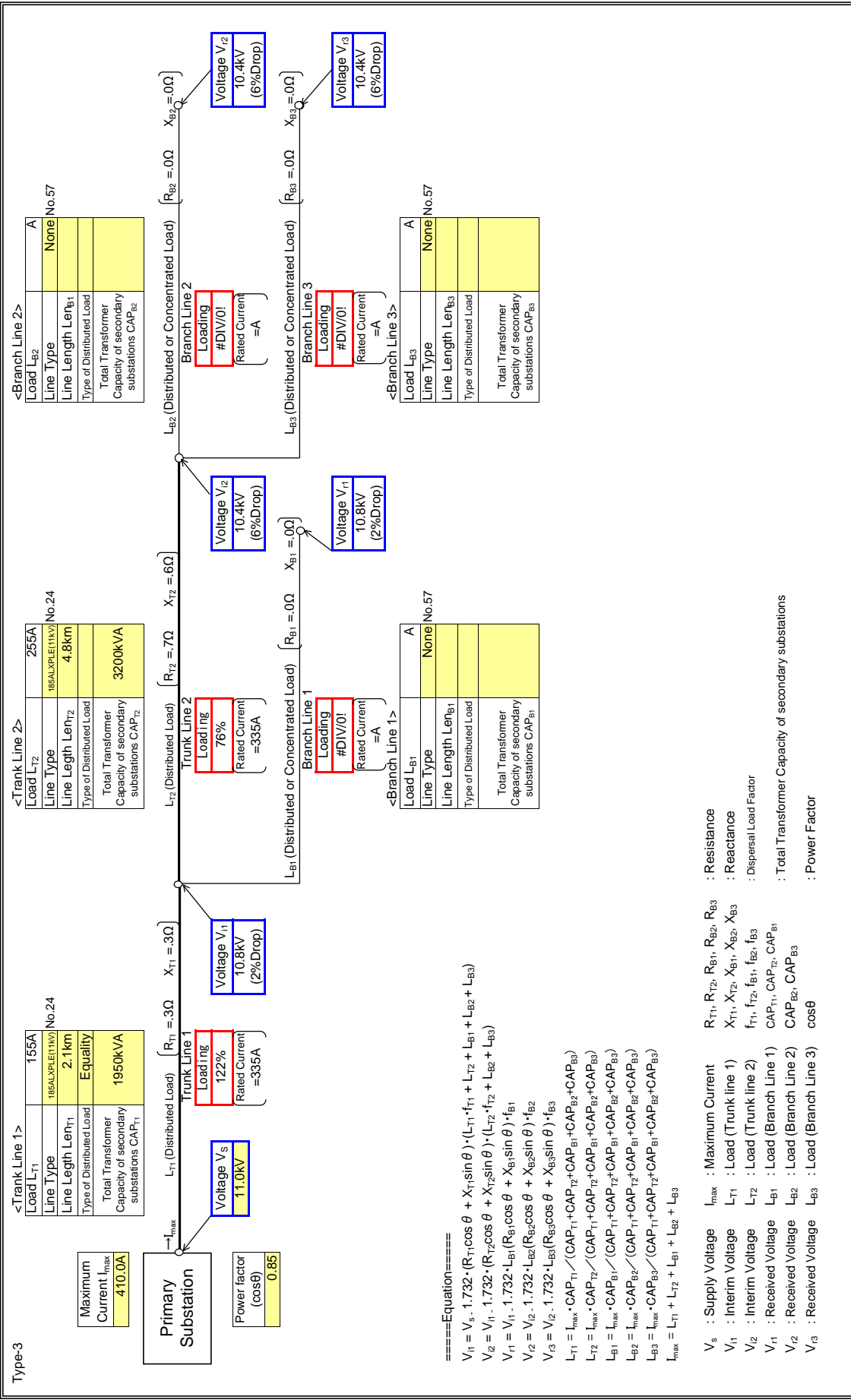
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

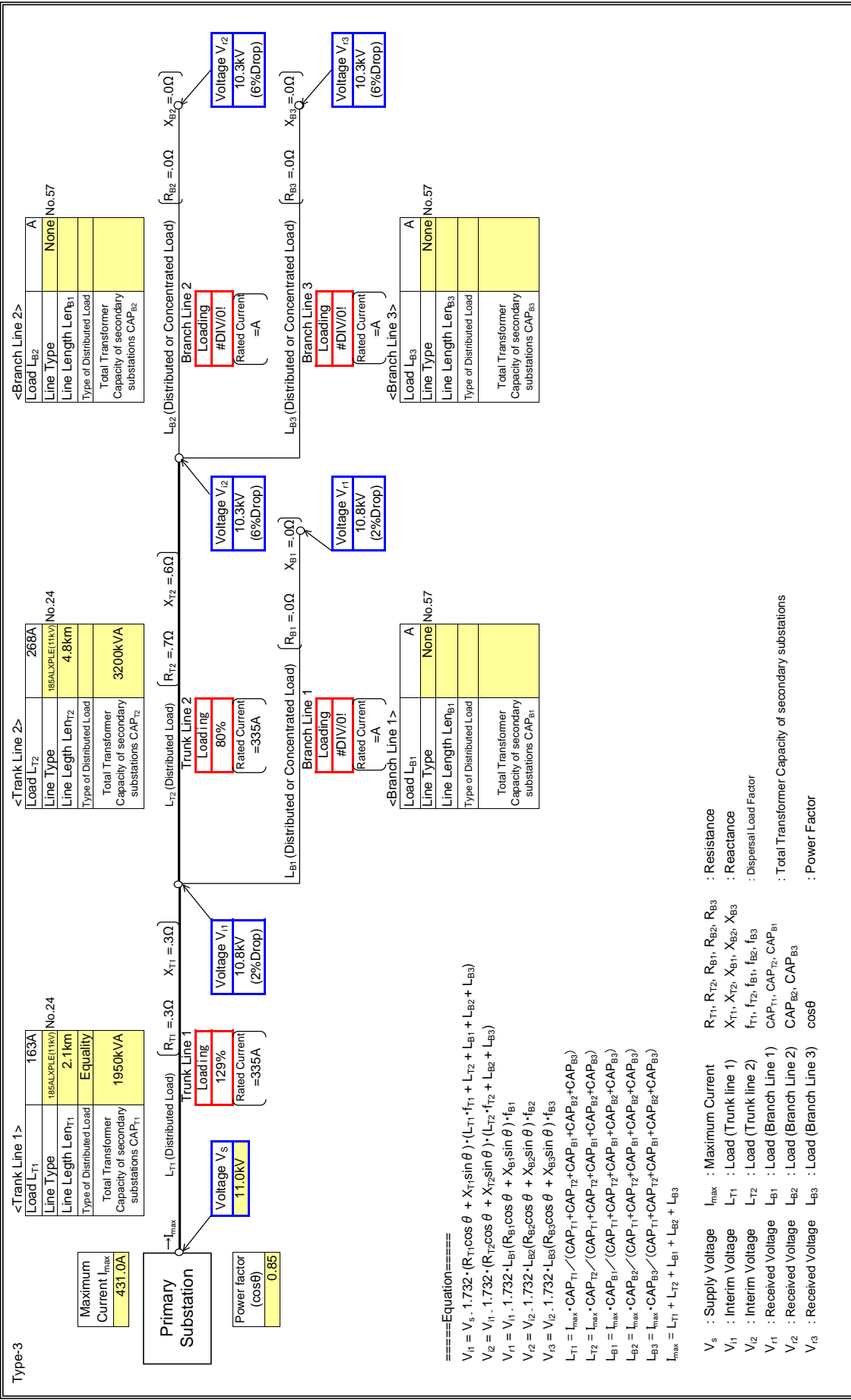
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

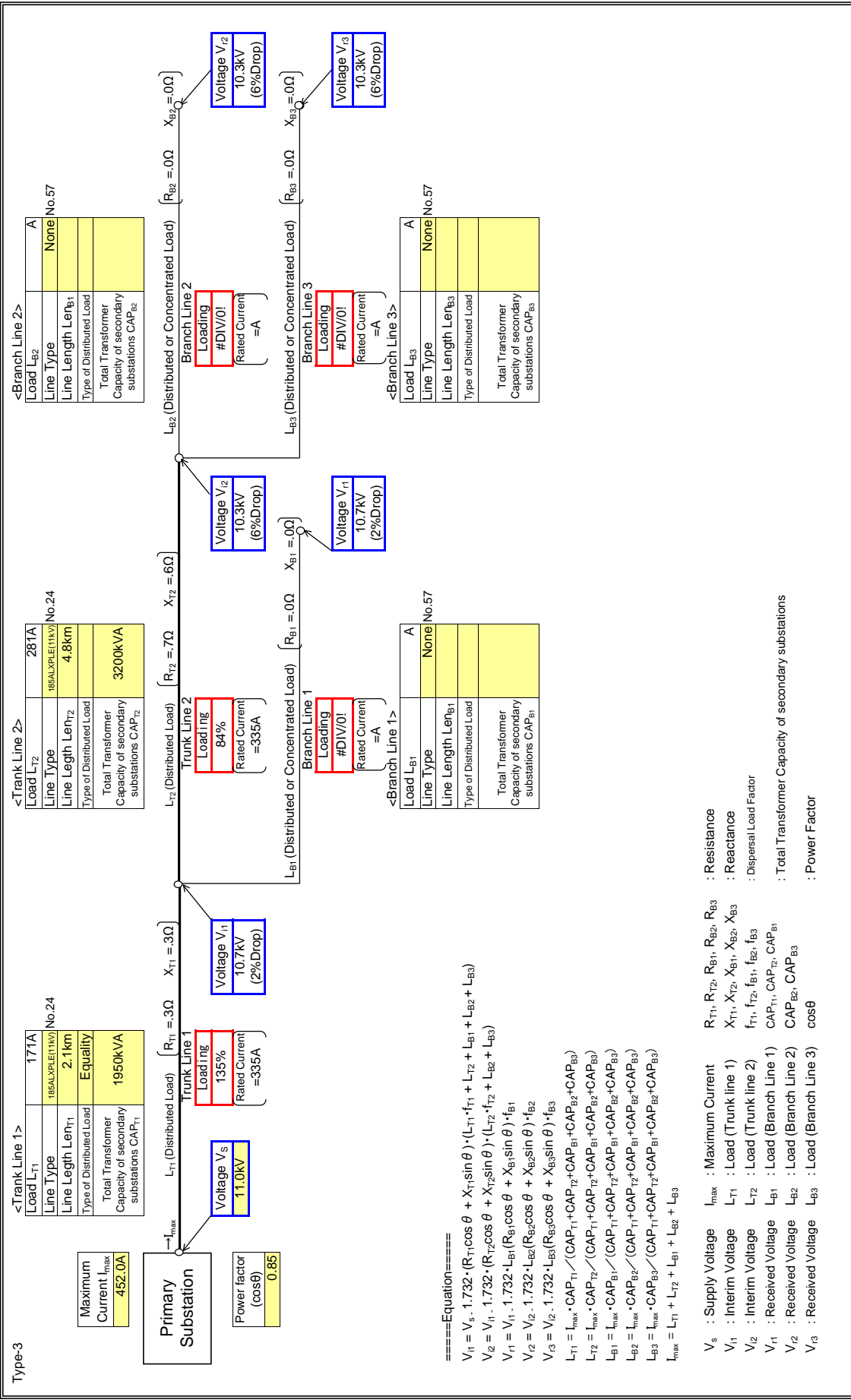
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

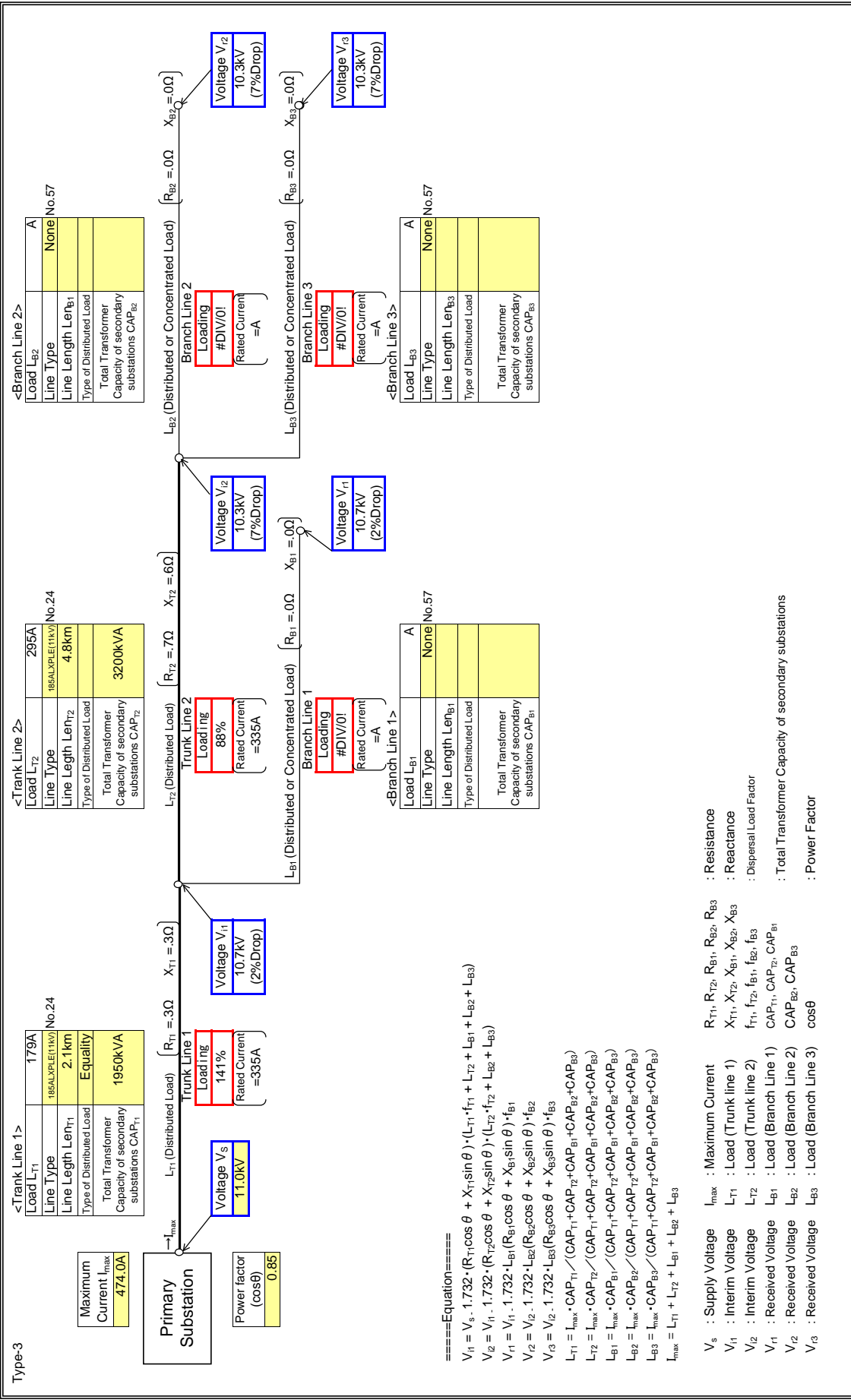
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R11

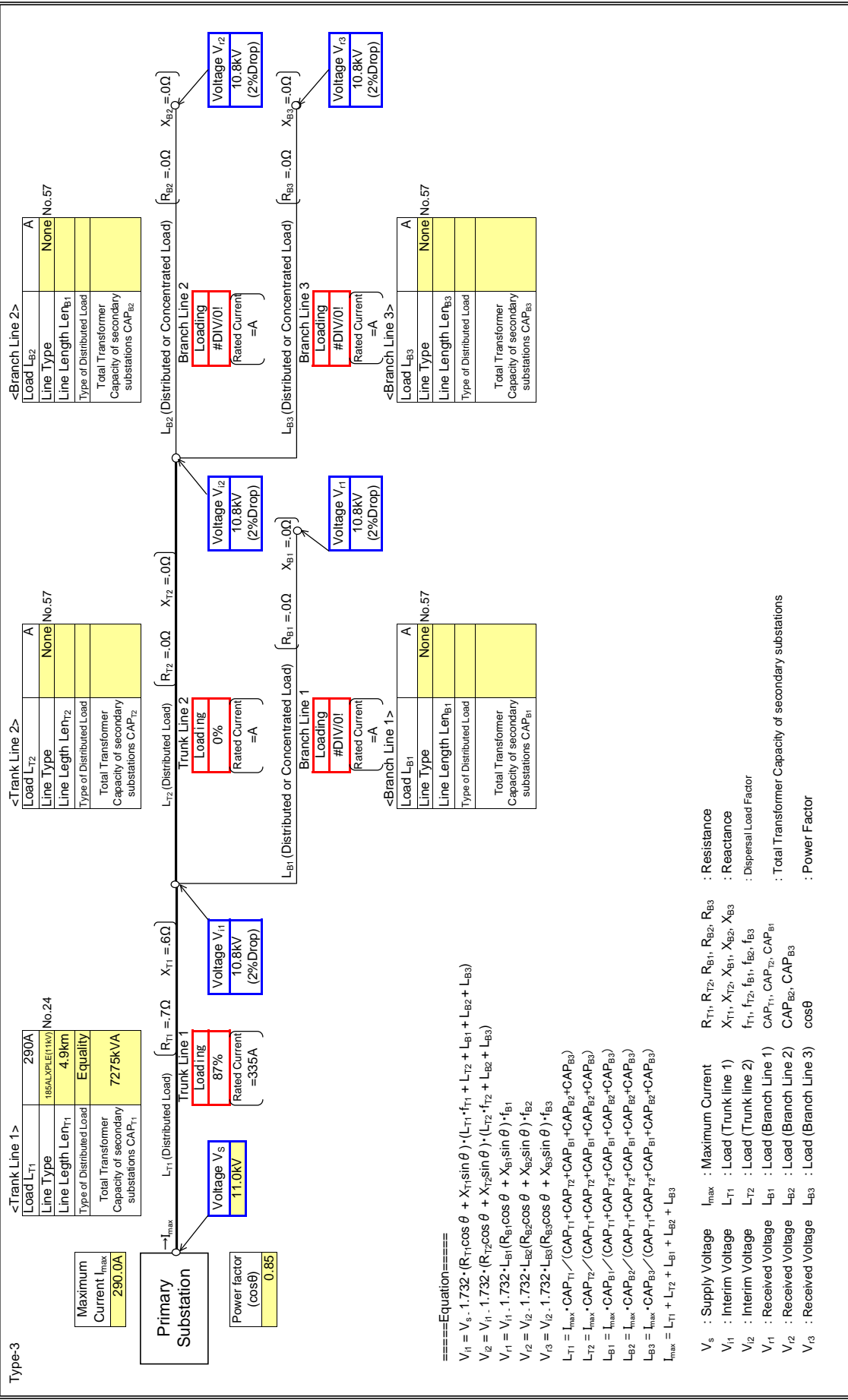
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

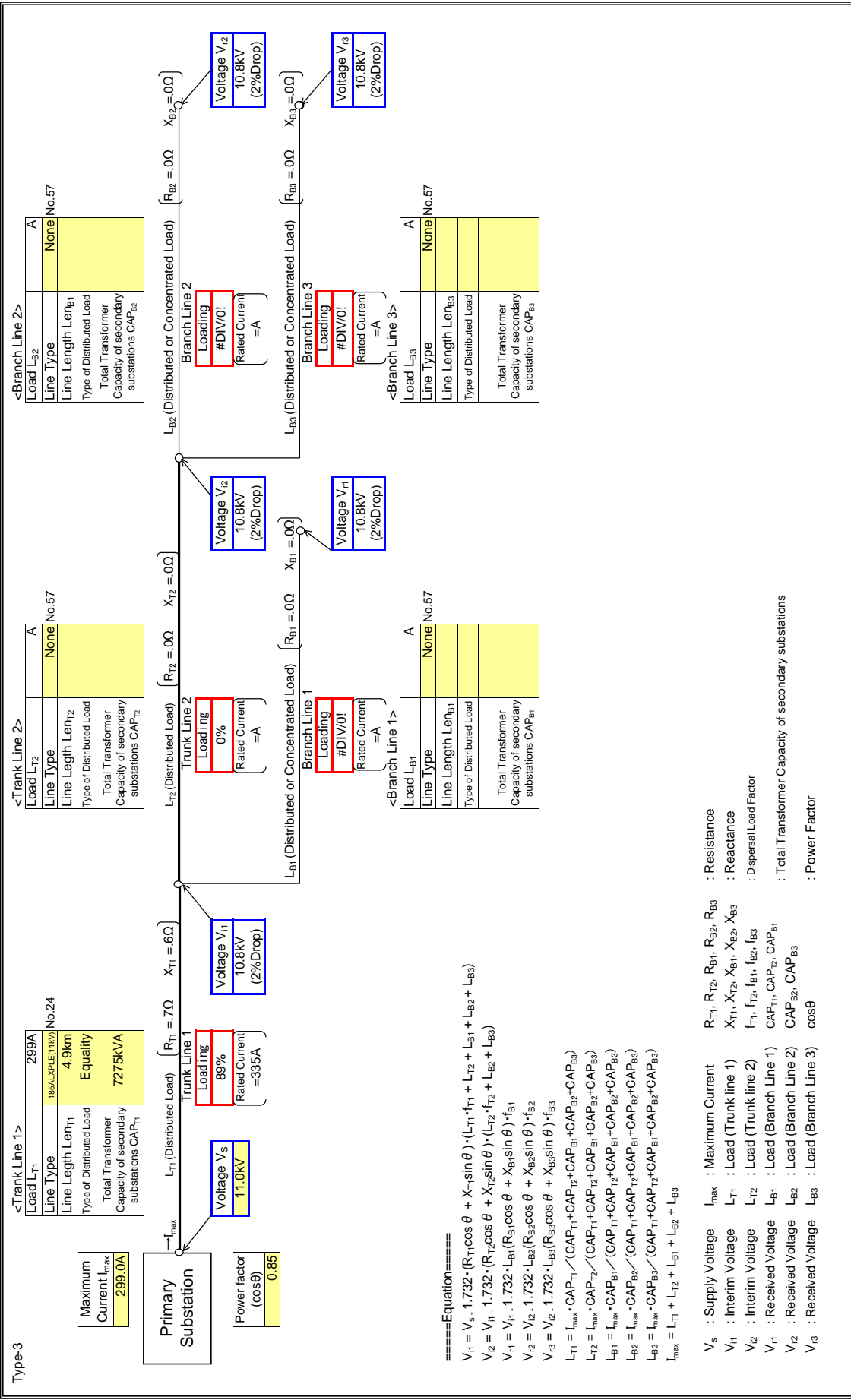
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

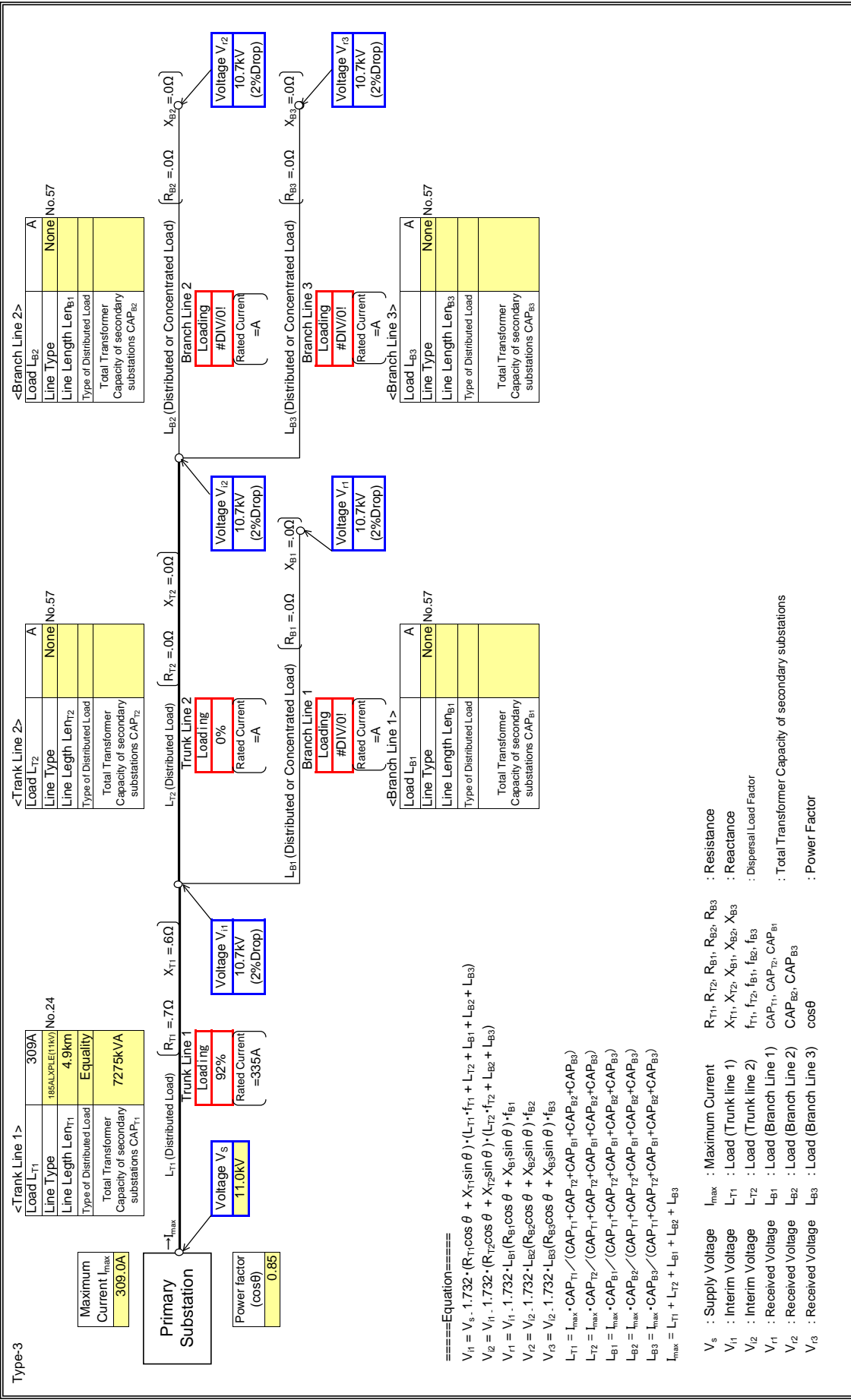
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

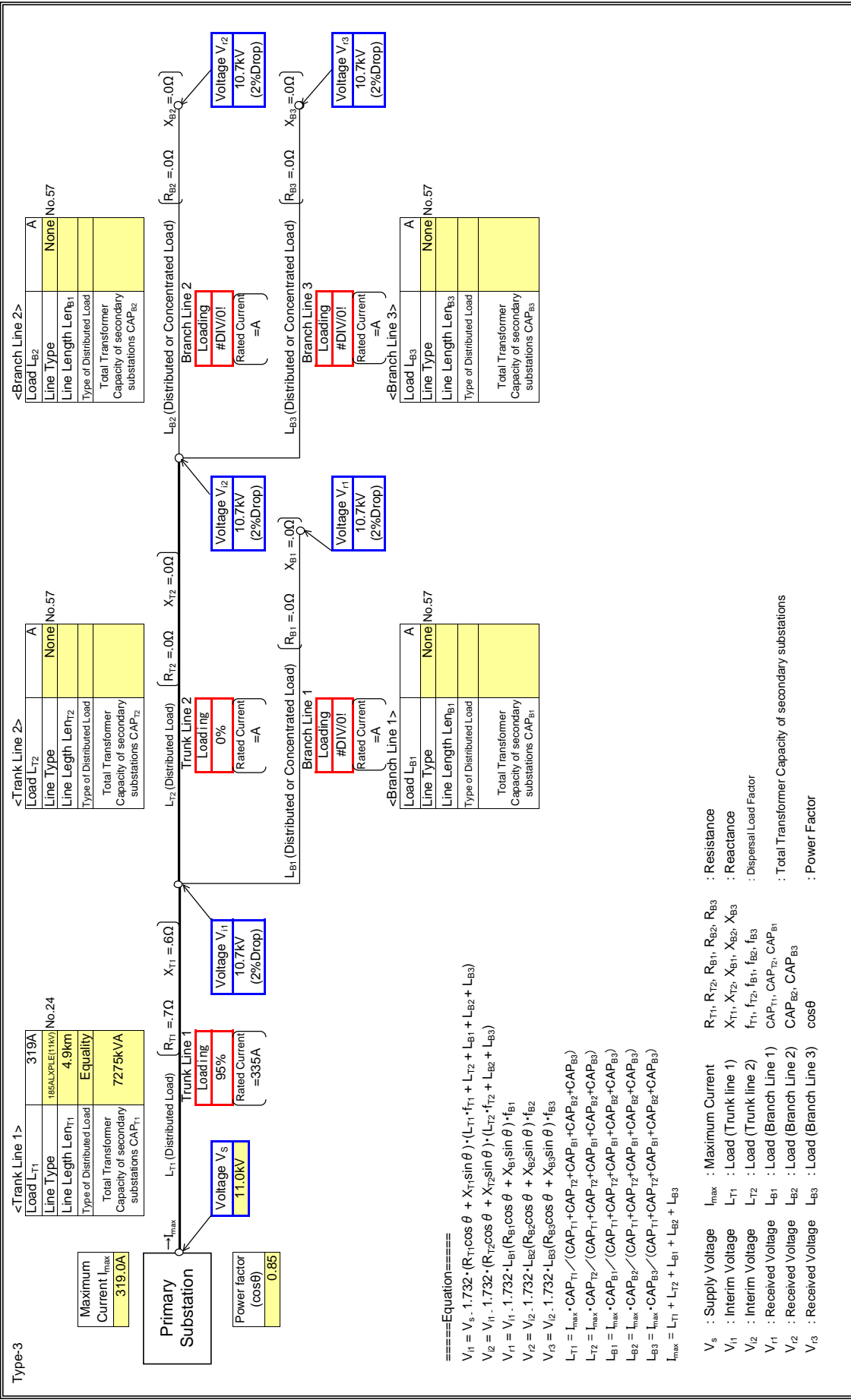
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

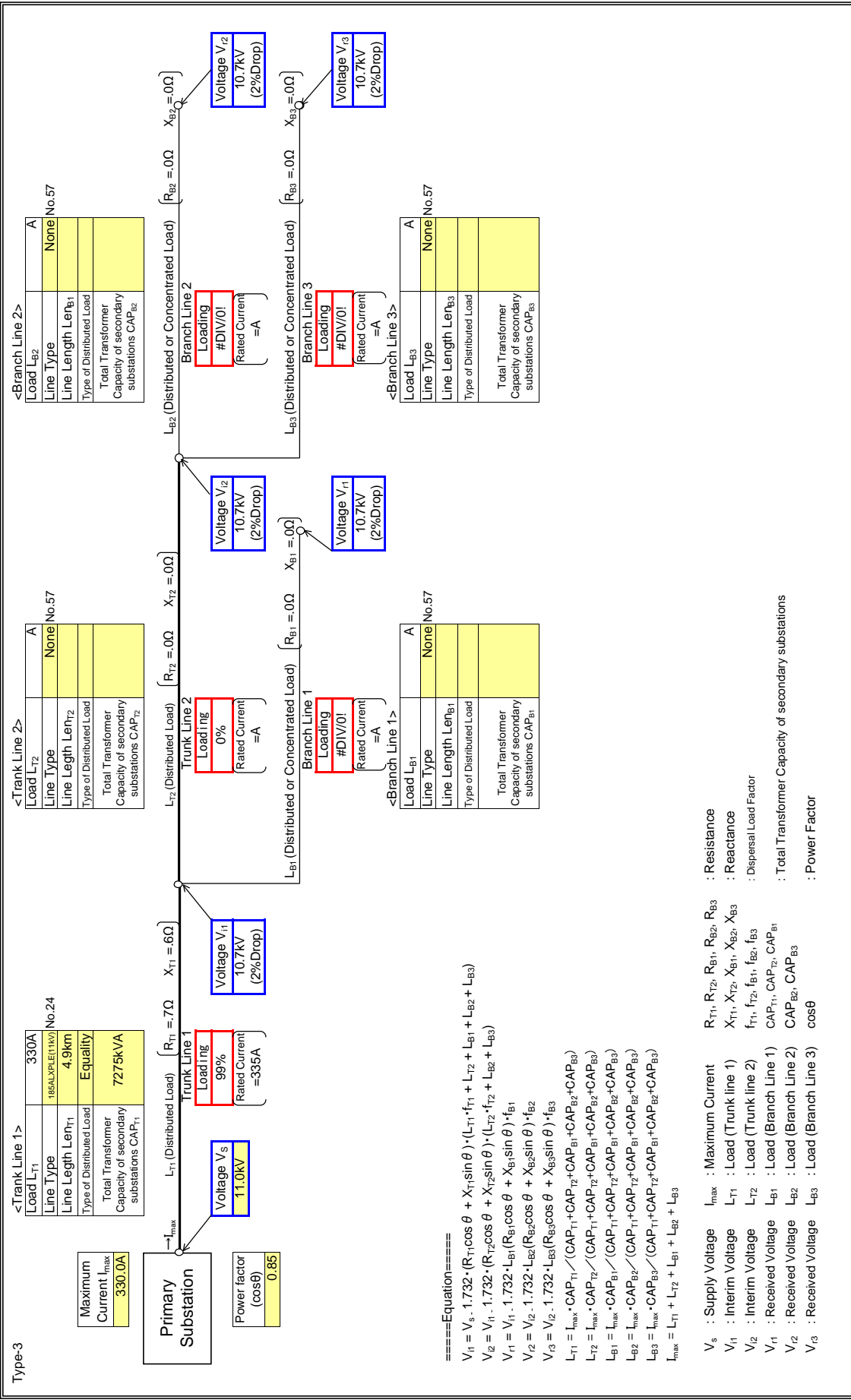
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

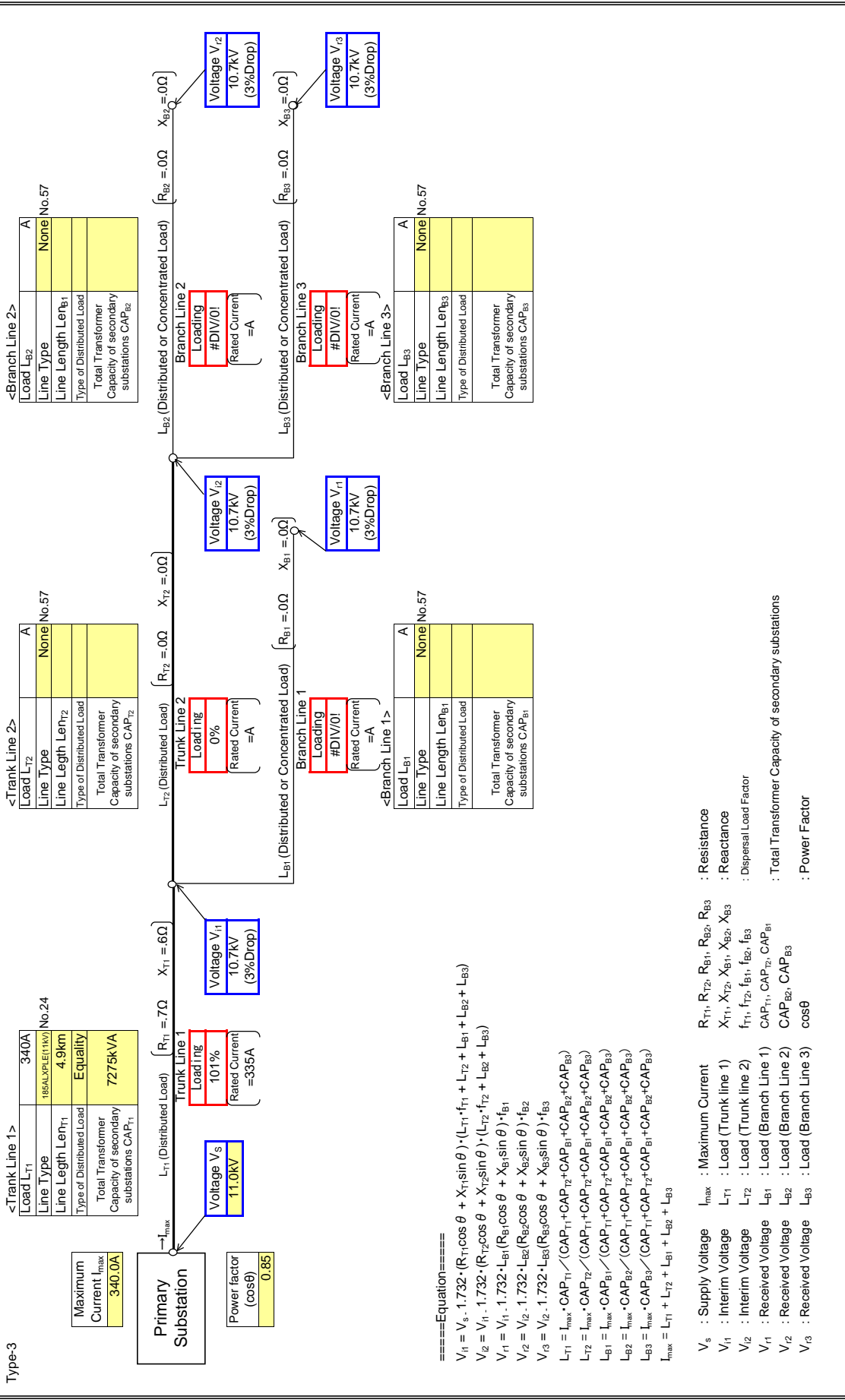
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

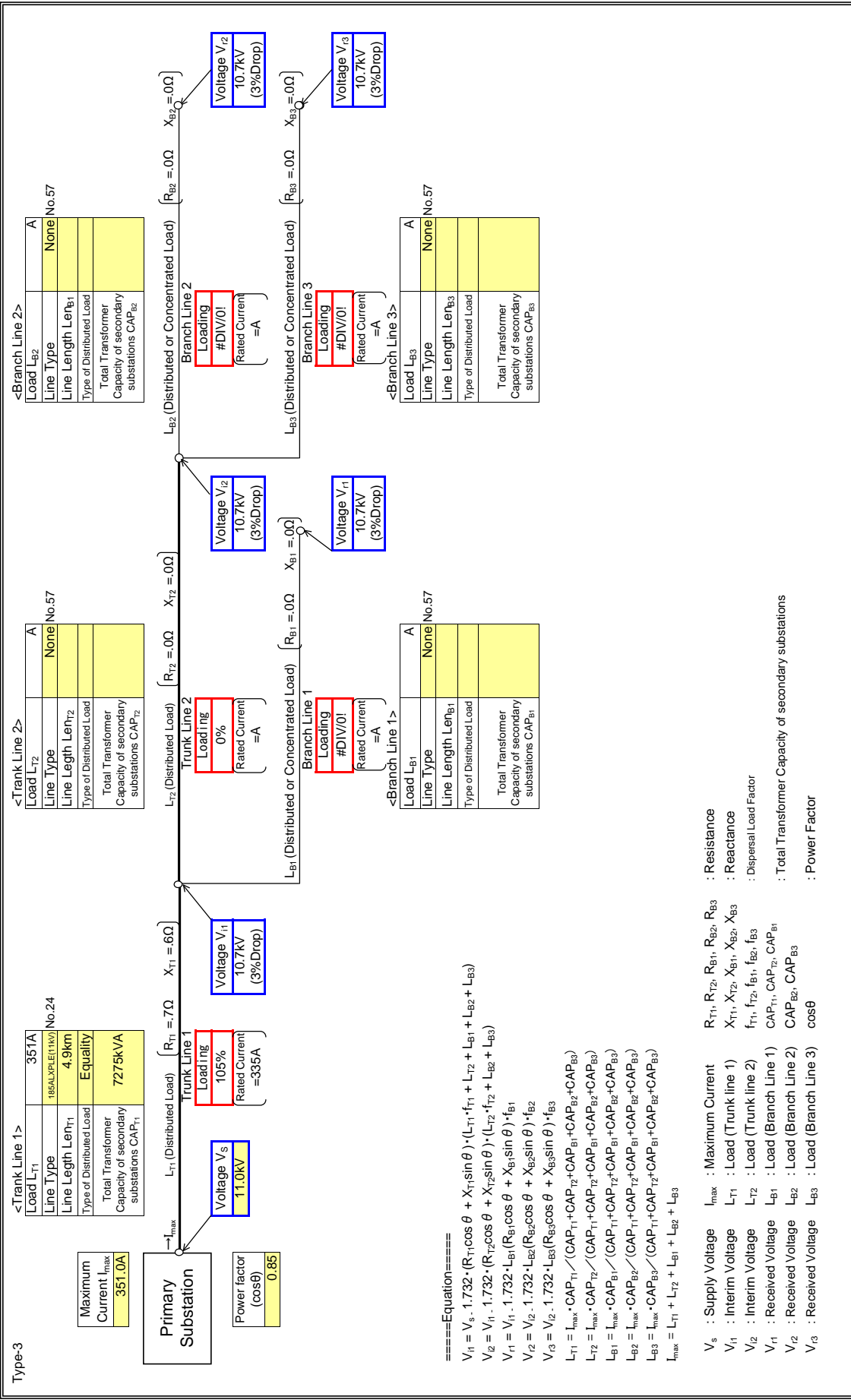
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

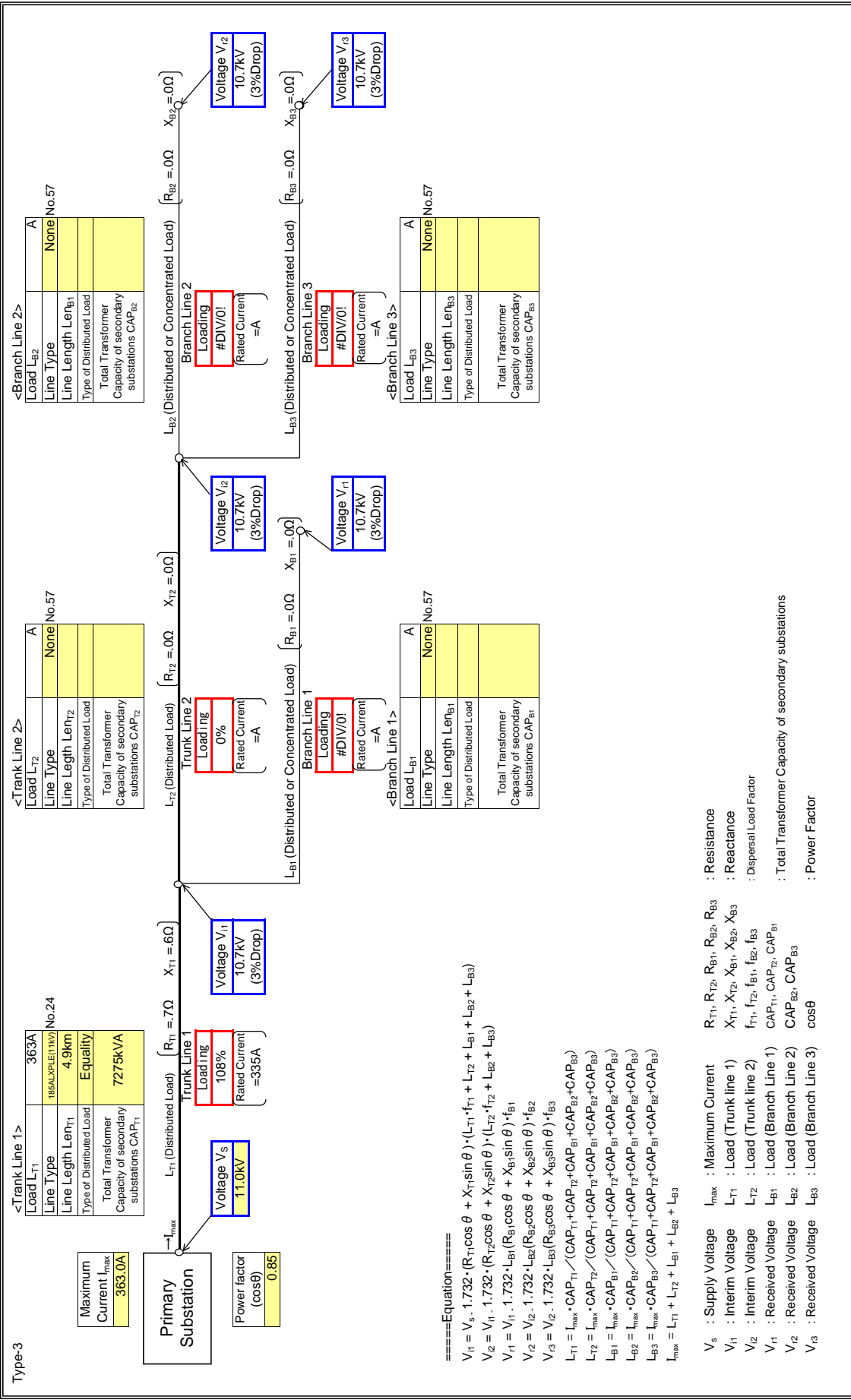
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

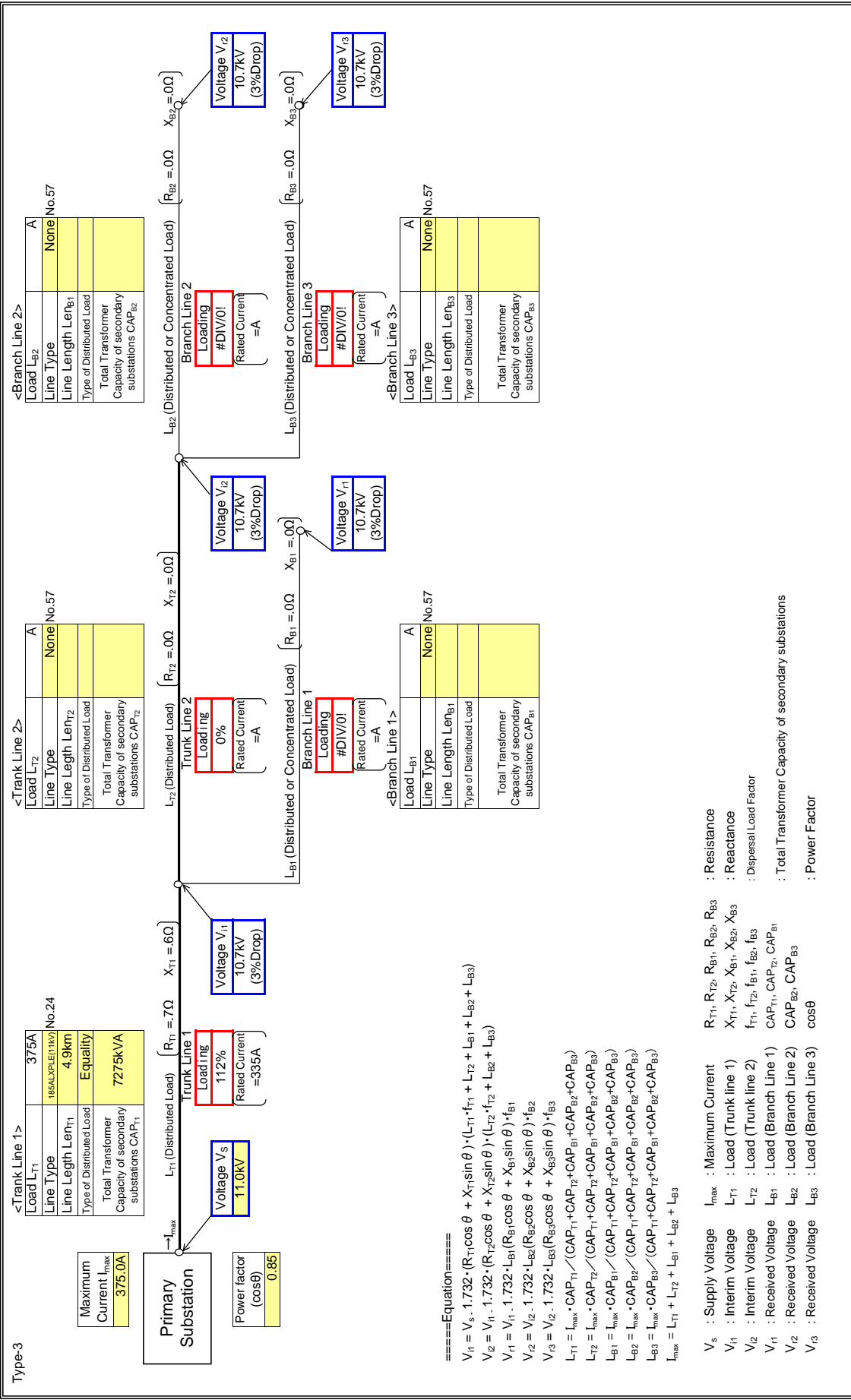
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

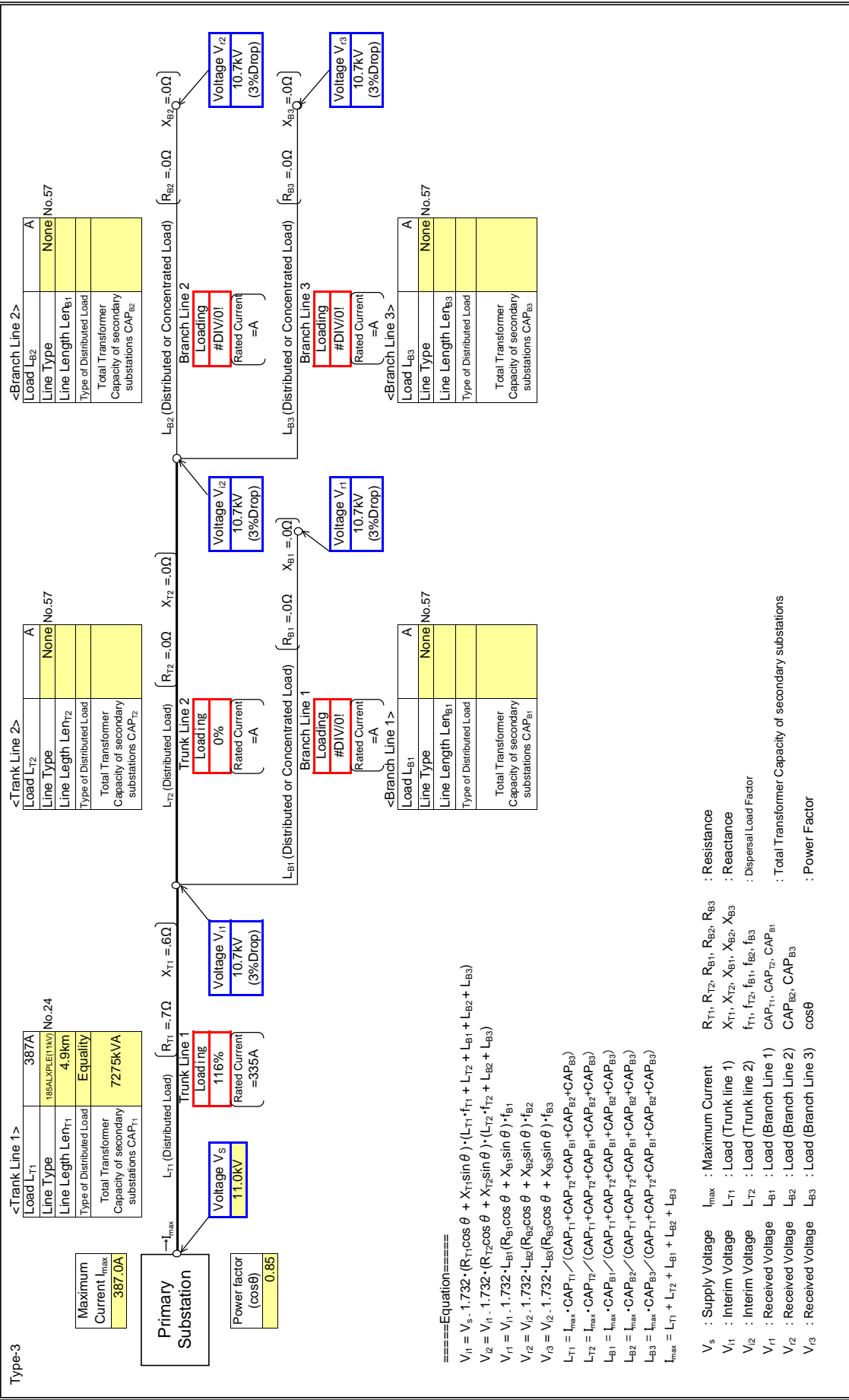
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

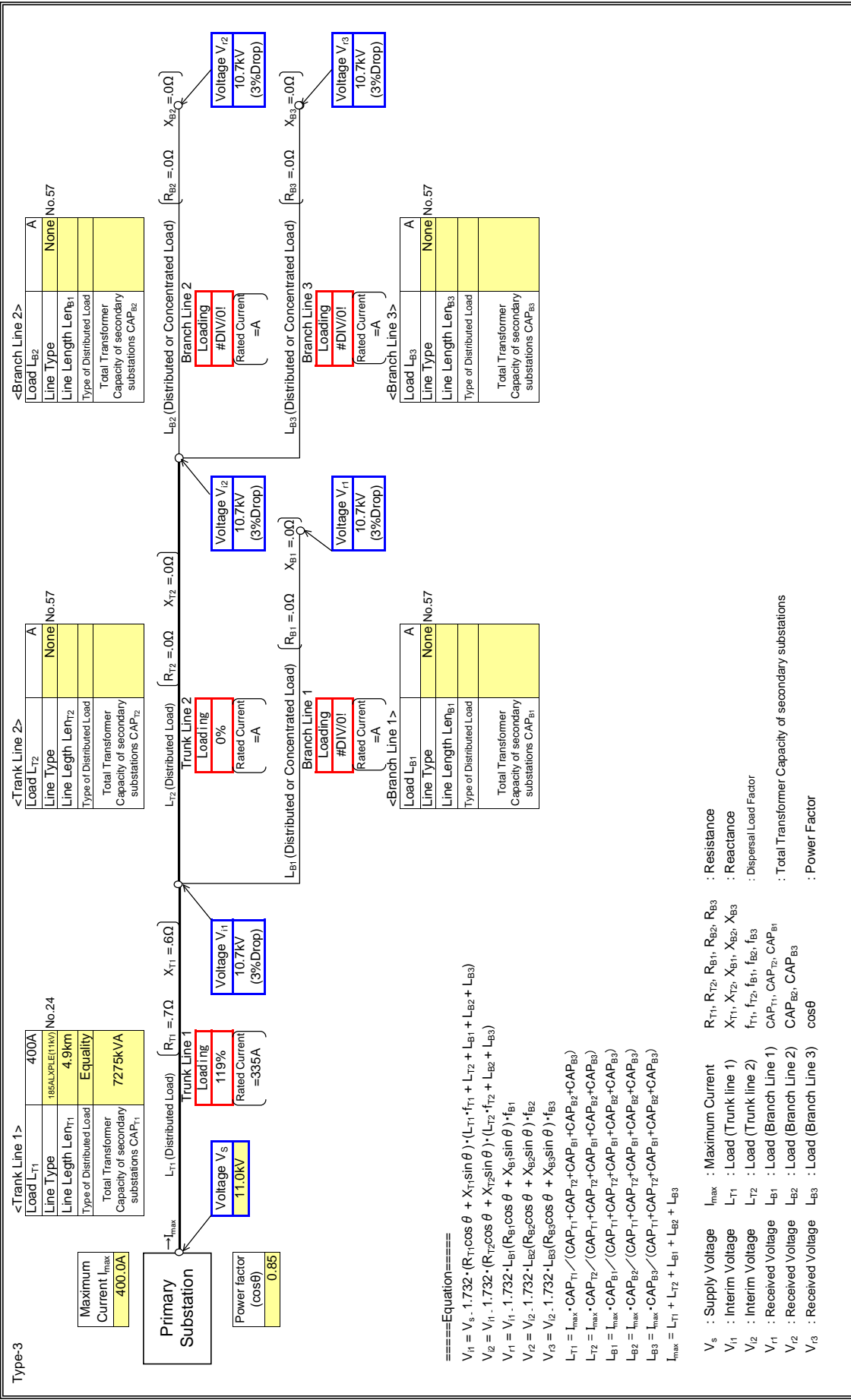
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

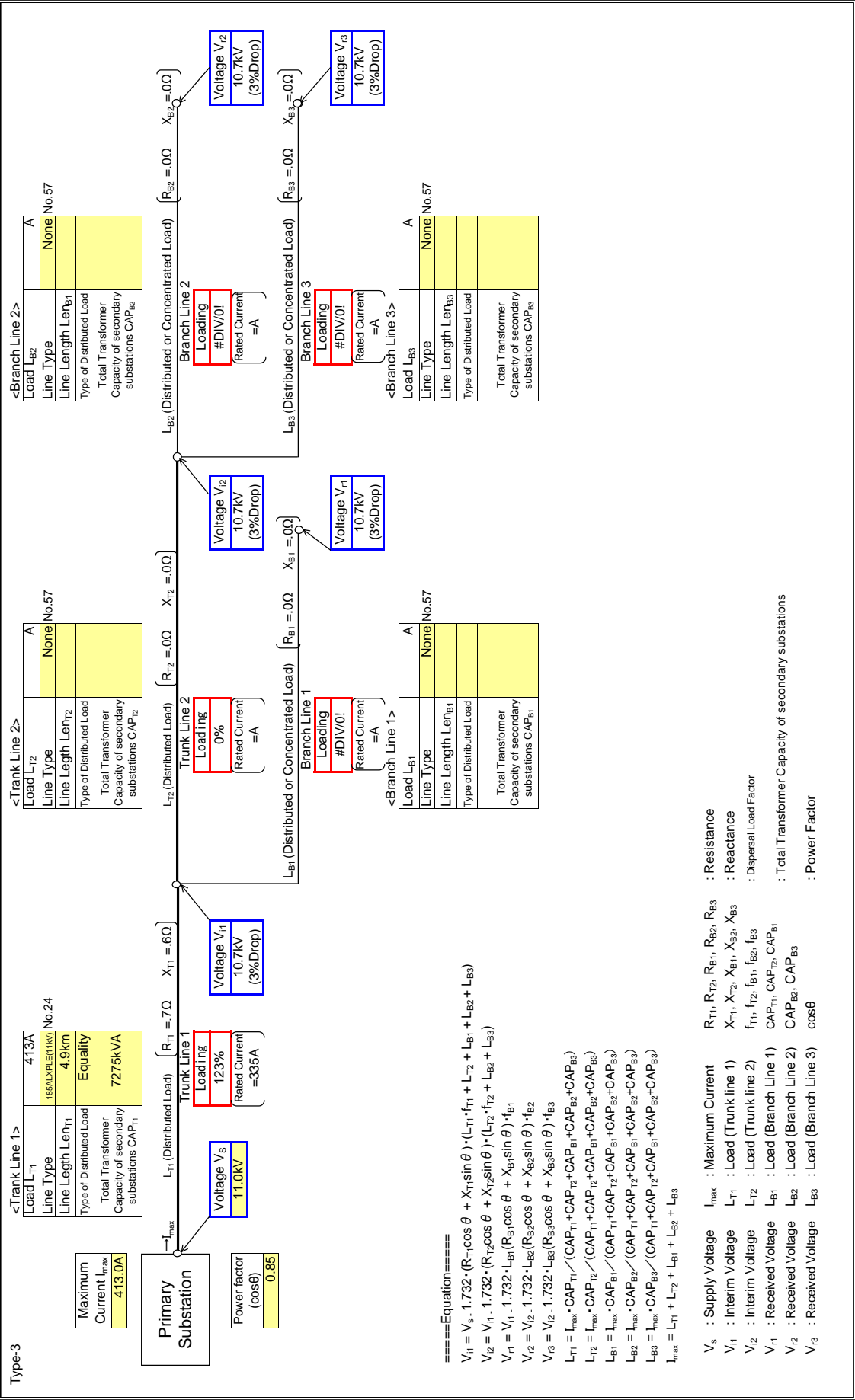
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R12

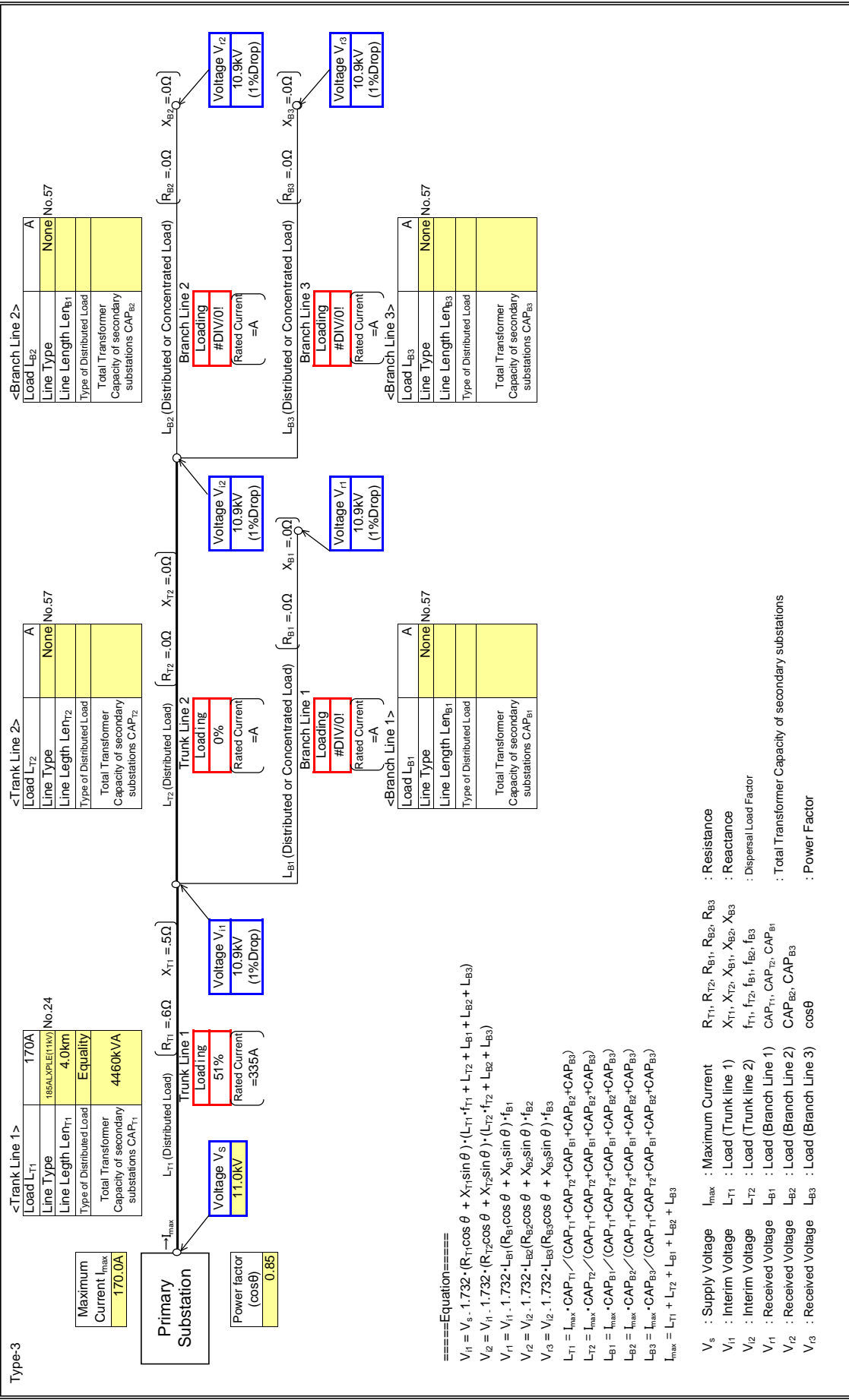
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

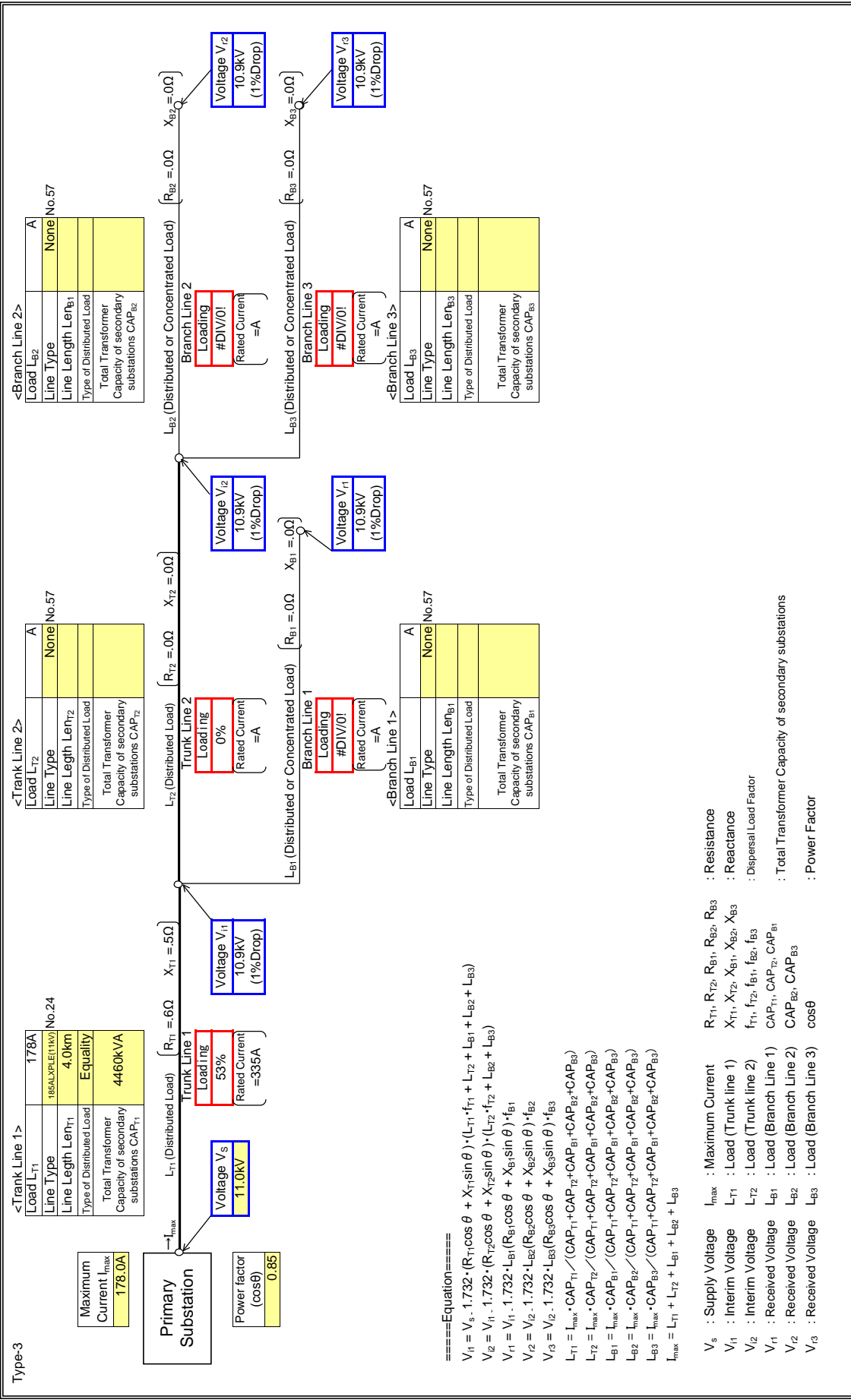
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

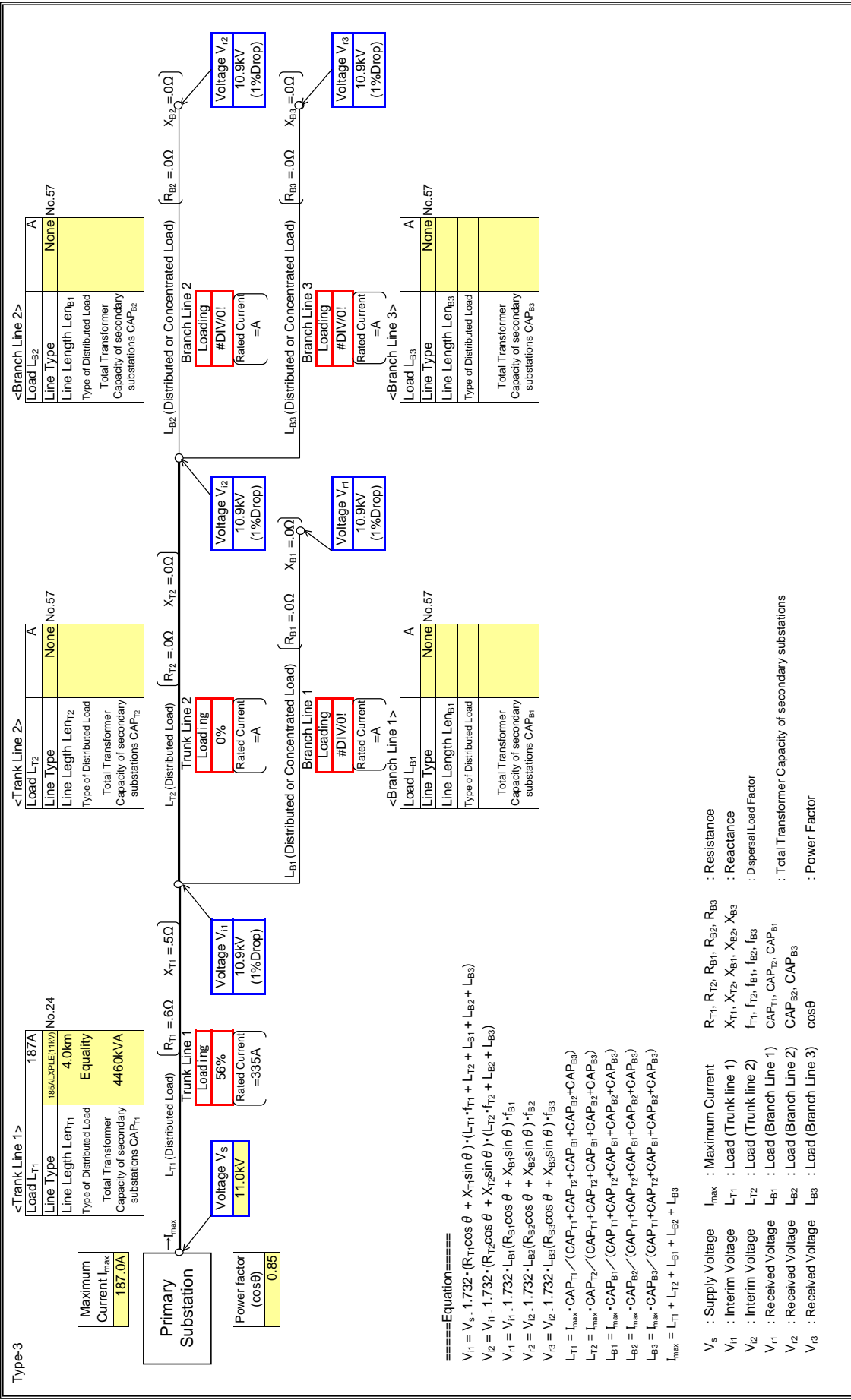
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

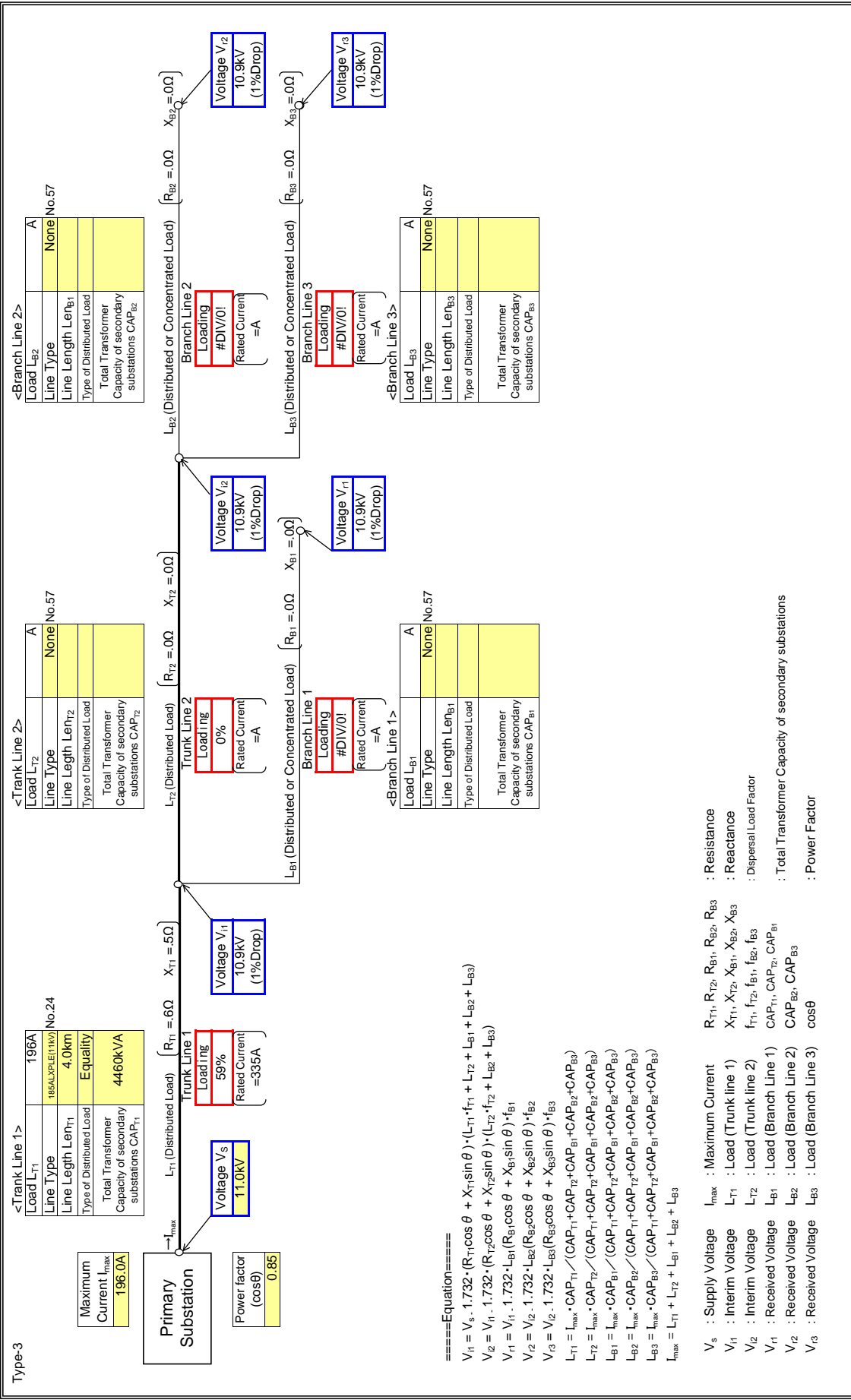
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

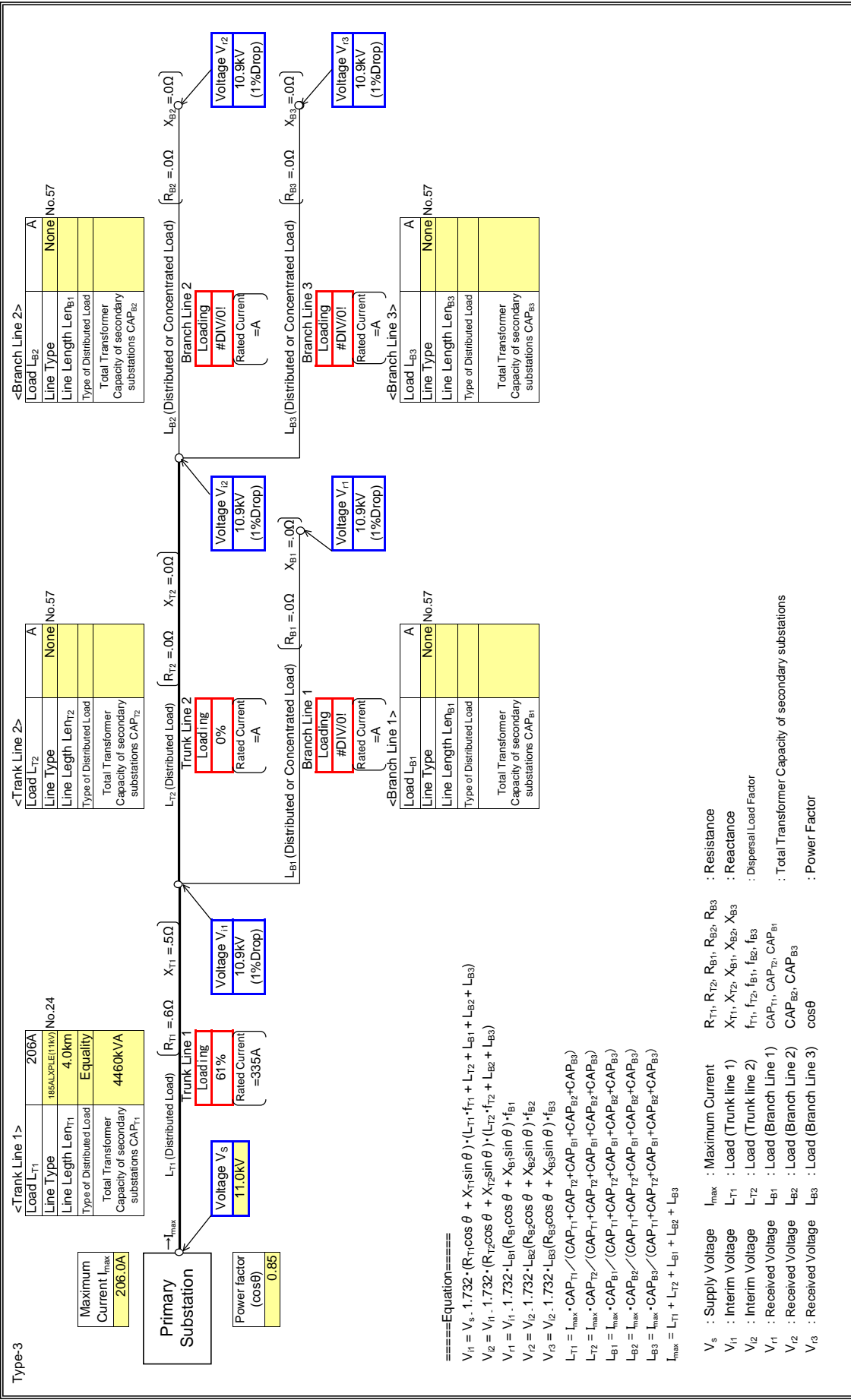
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

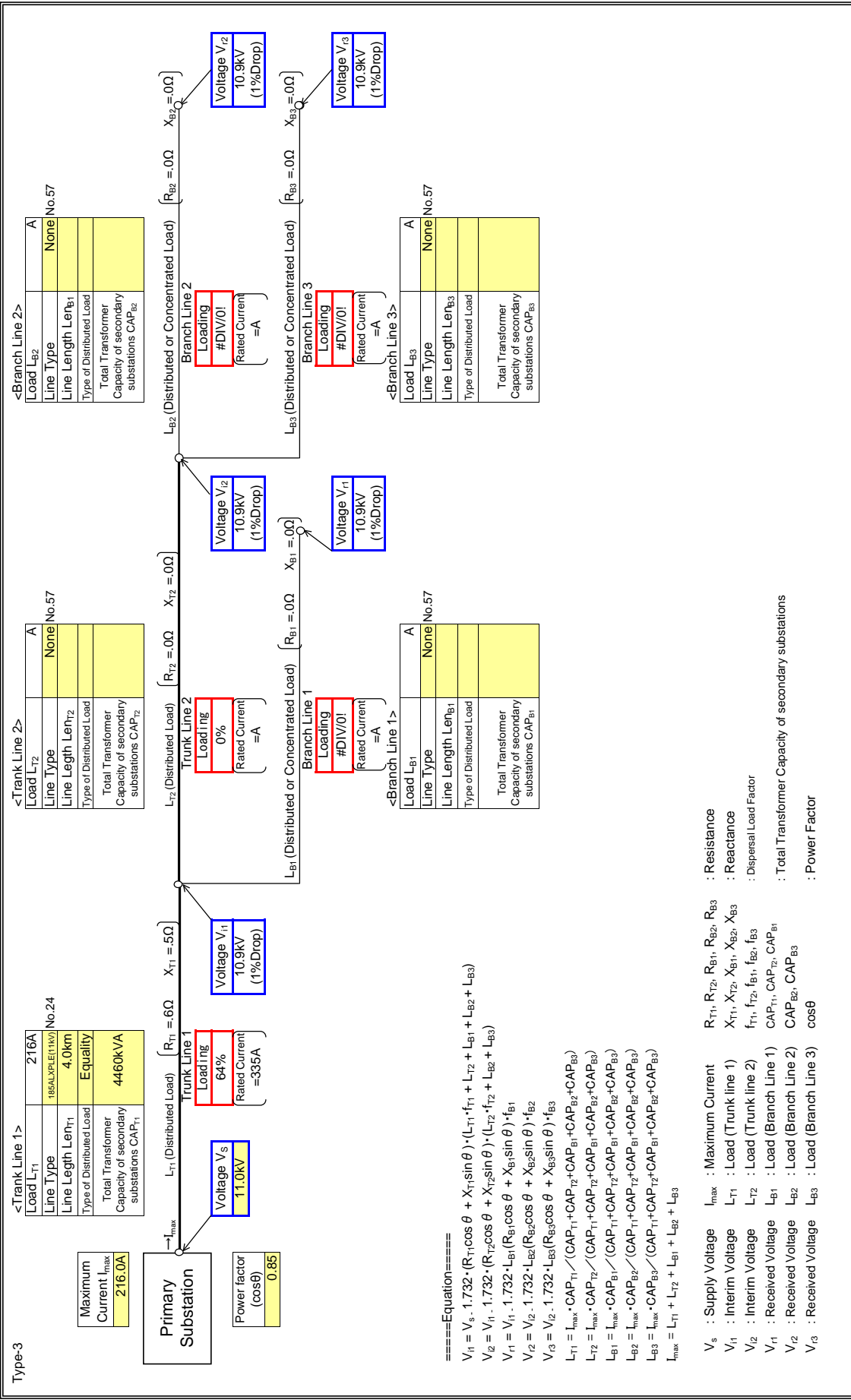
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

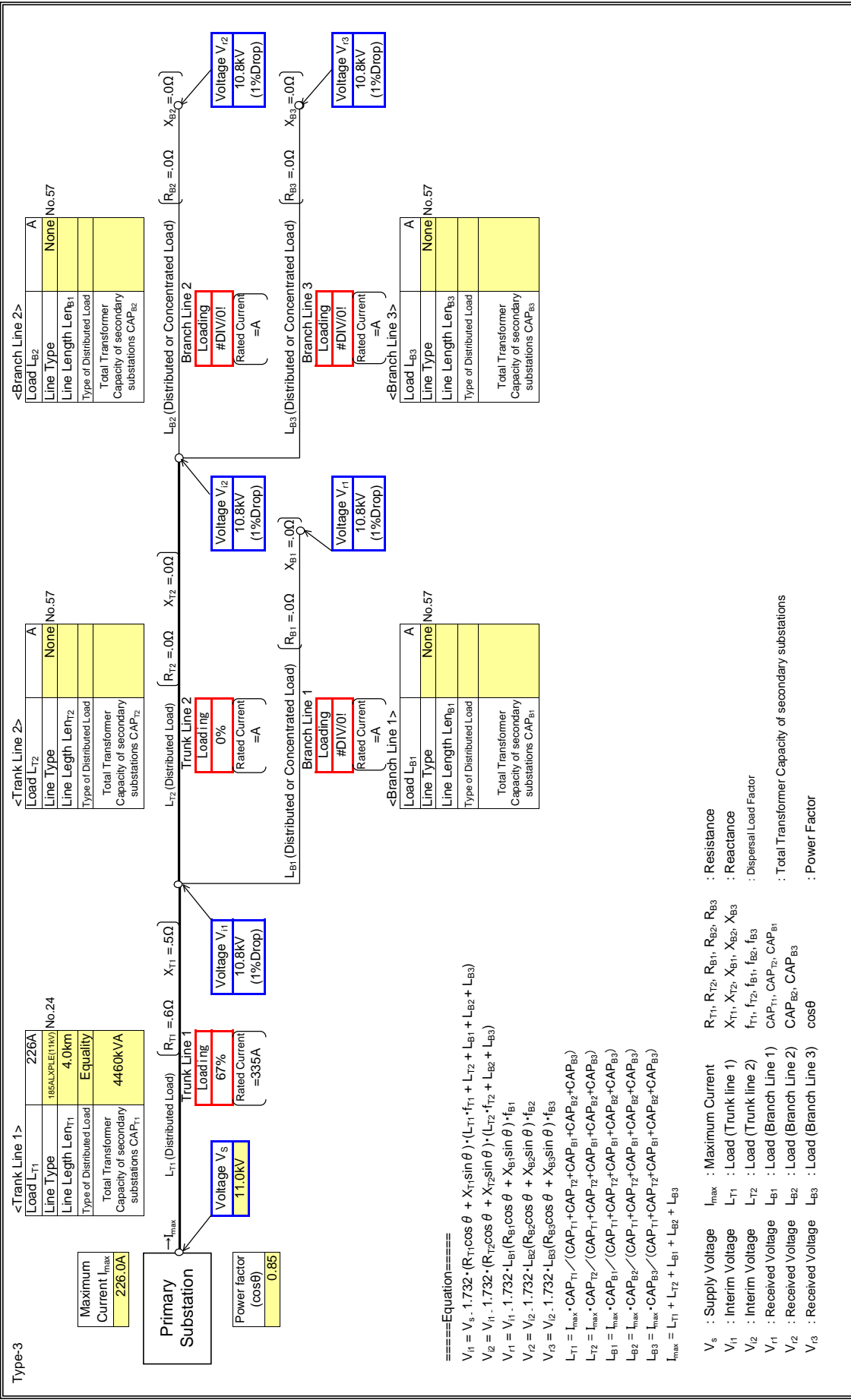
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

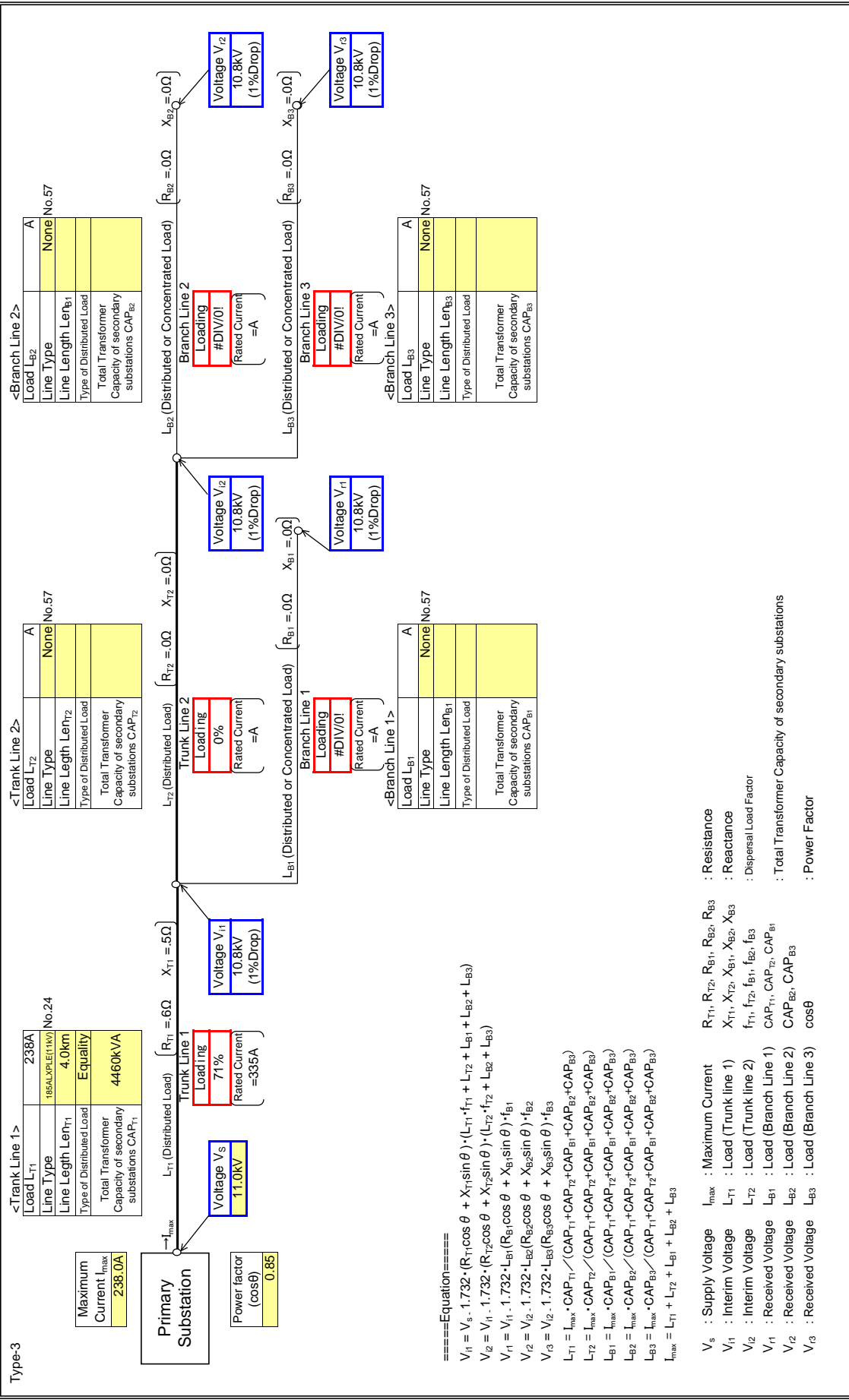
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

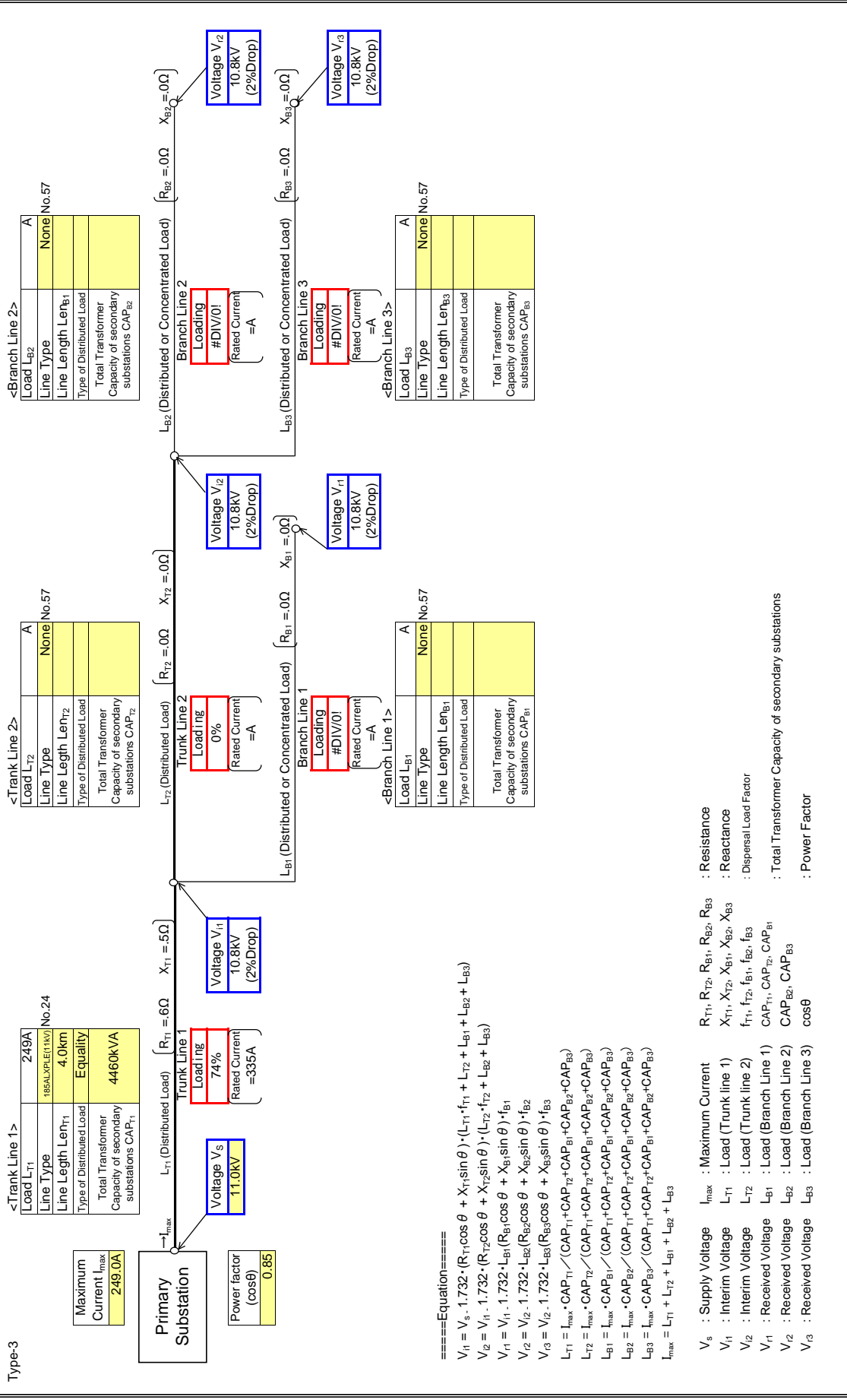
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

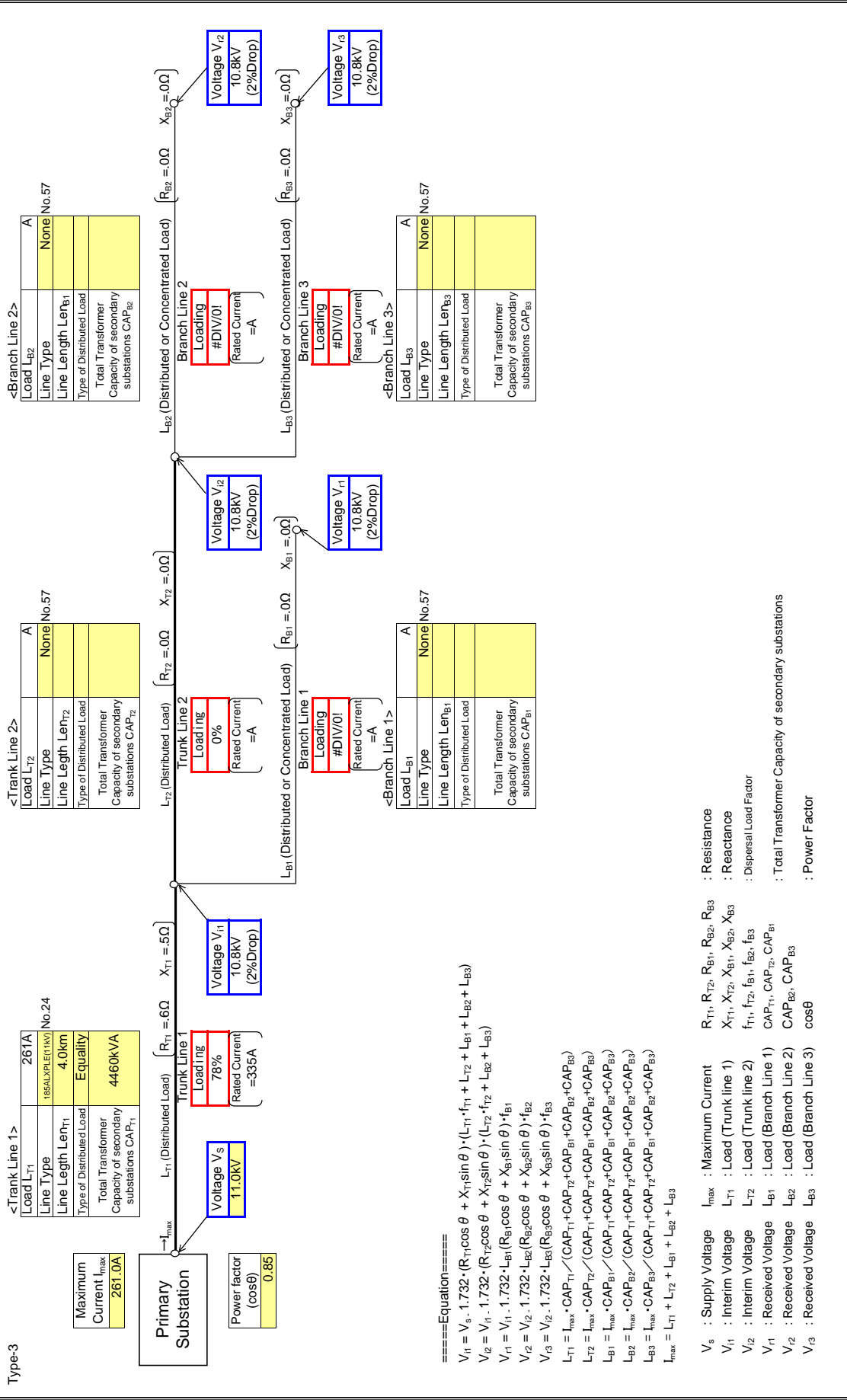
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

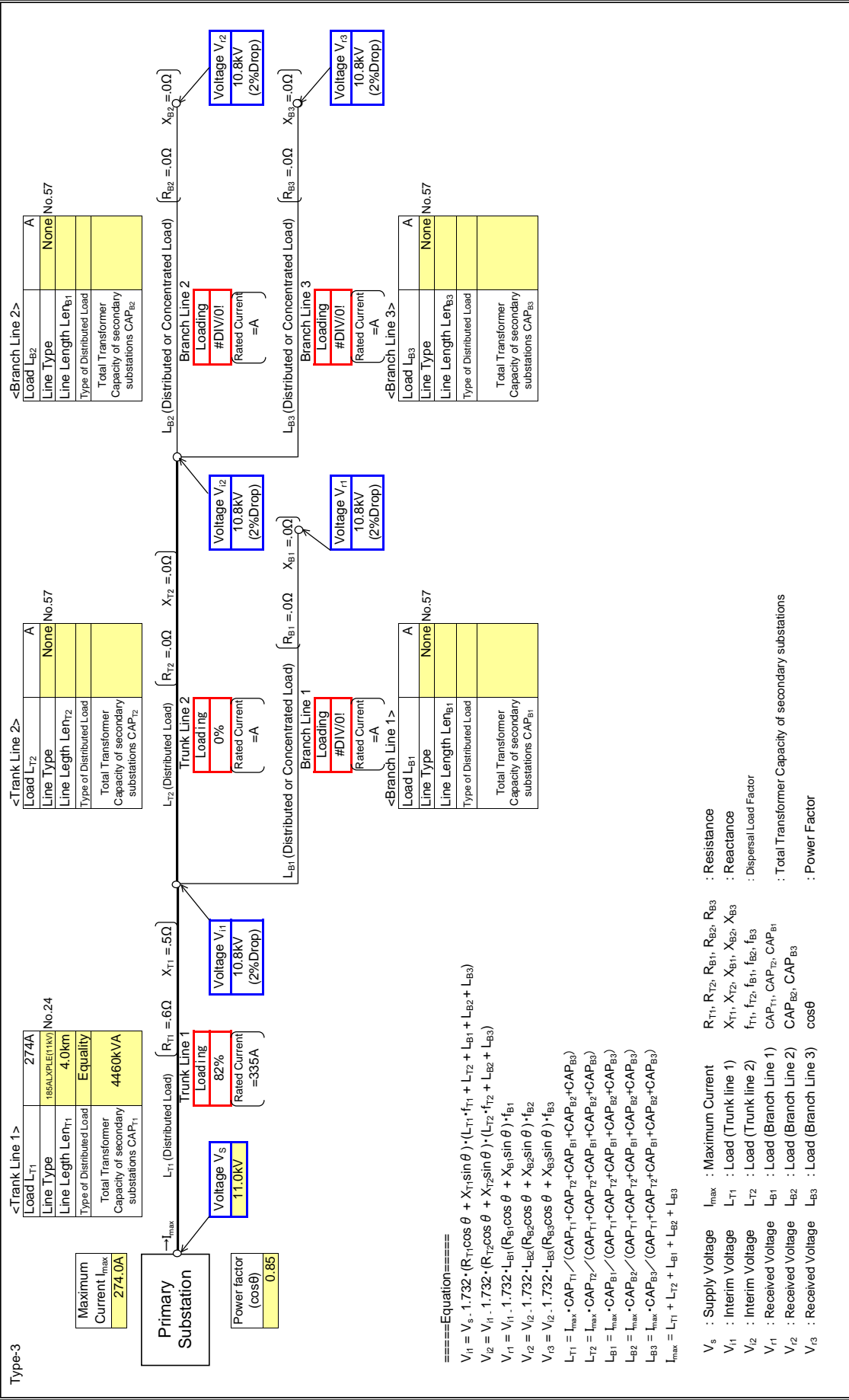
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

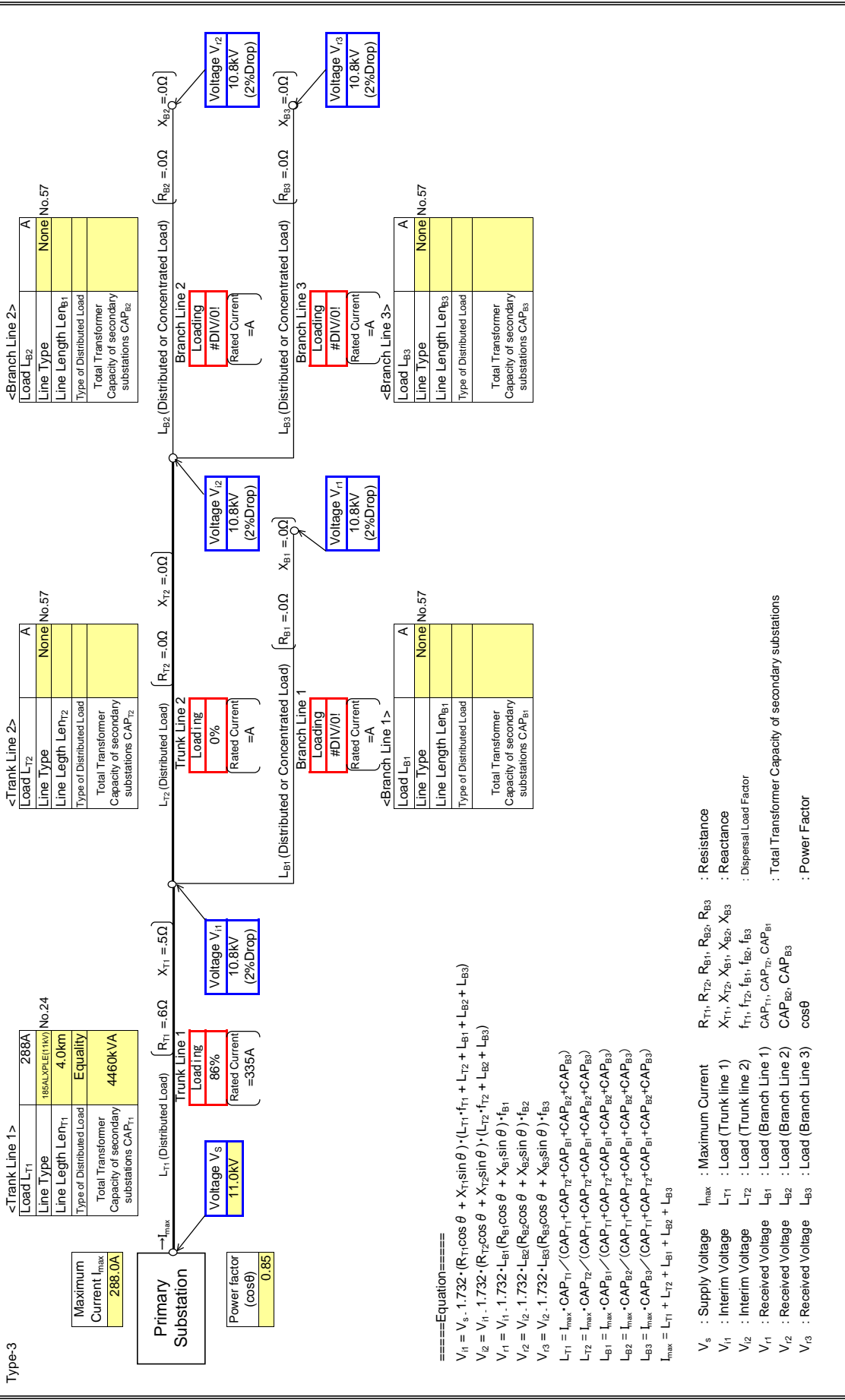
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R13

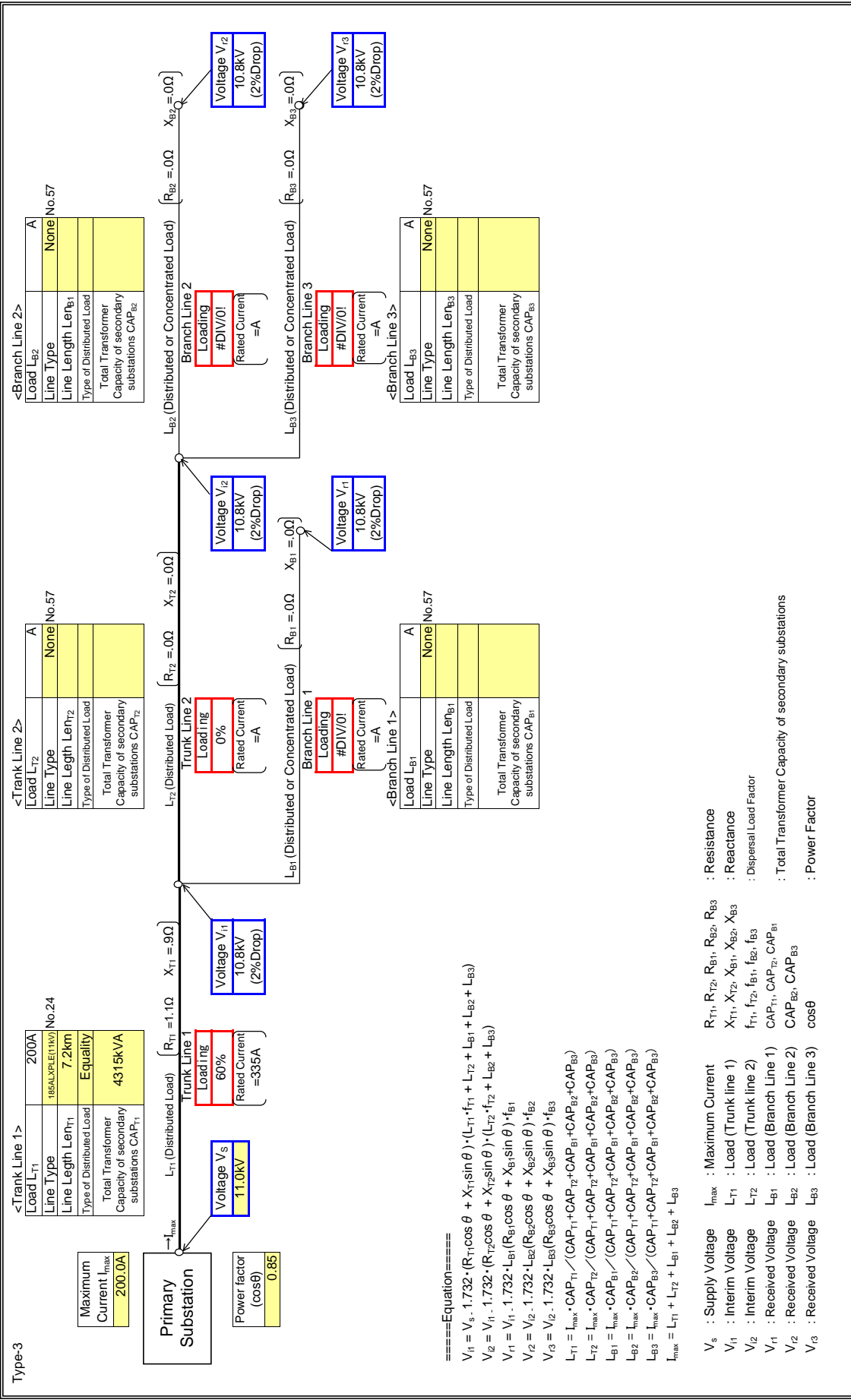
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

Type-3 : Input data in colored cells



<Branch Line 2>

Load L _{B2}	A
Line Type	None
Line Length Le _{B2}	No.57
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{B2}	

<Trunk Line 2>

Load L _{T2}	A
Line Type	None
Line Length Le _{T2}	No.57
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{T2}	

<Trunk Line 1>

Load L _{T1}	200A
Line Type	185ALXPLE(11KV)
Line Length Le _{T1}	No.24
Type of Distributed Load	Equality
Total Transformer Capacity of secondary substations CAP _{T1}	4315KVA

Branch Line 2

Loading	#DIV/0!
Rated Current	=A

Trunk Line 2

Loading	0%
Rated Current	=A

Trunk Line 1

Loading	60%
Rated Current	=335A

Branch Line 3

Loading	#DIV/0!
Rated Current	=A

Branch Line 1

Loading	#DIV/0!
Rated Current	=A

Branch Line 1

Loading	60%
Rated Current	=335A

<Branch Line 3>

Load L _{B3}	A
Line Type	None
Line Length Le _{B3}	
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{B3}	

<Branch Line 1>

Load L _{B1}	A
Line Type	None
Line Length Le _{B1}	
Type of Distributed Load	
Total Transformer Capacity of secondary substations CAP _{B1}	

====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{i1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{i2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{i3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = L_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = L_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = L_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = L_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = L_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

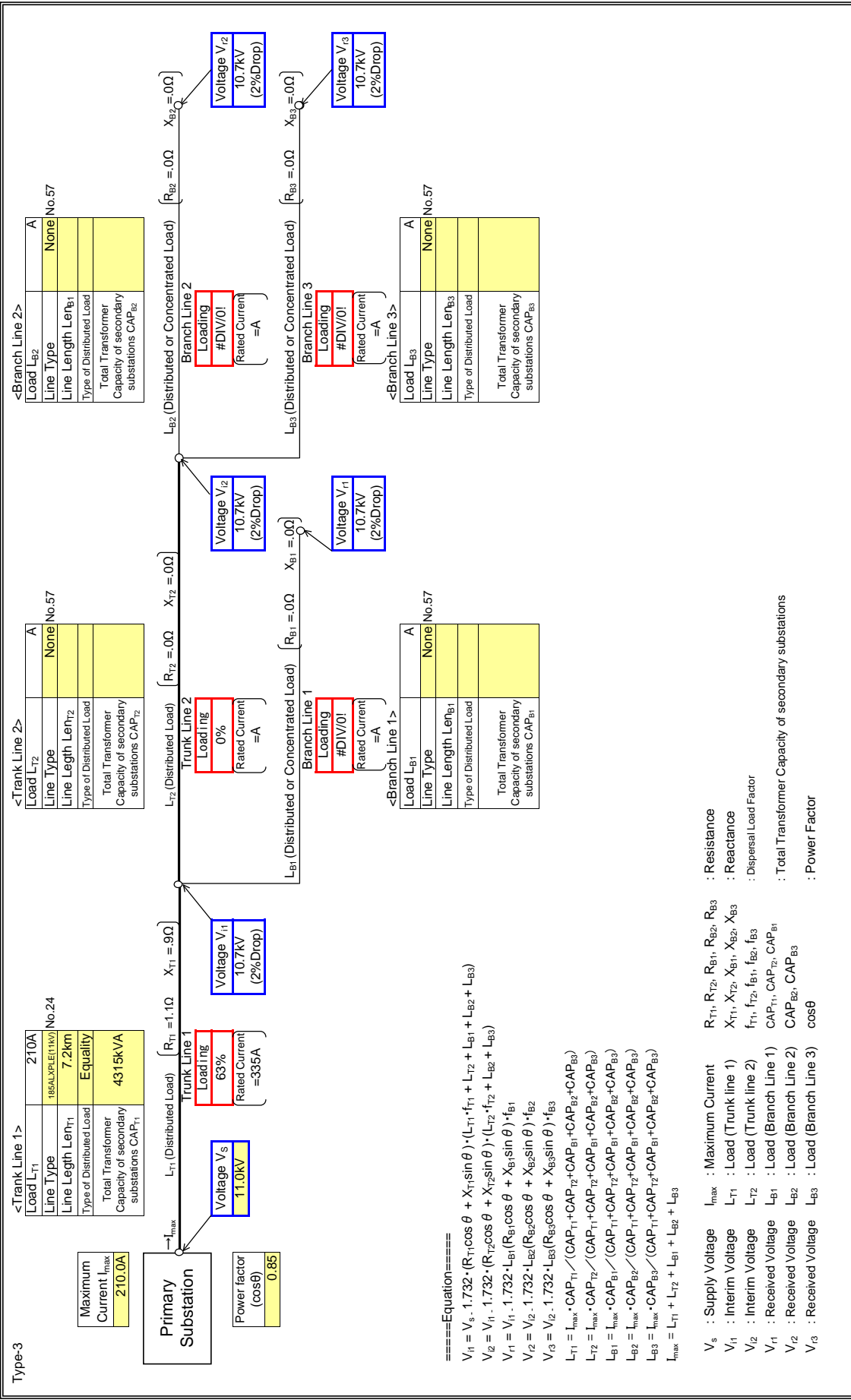
$$L_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

- V_s : Supply Voltage
- V_{i1} : Interim Voltage
- V_{i2} : Interim Voltage
- V_{i1} : Received Voltage
- V_{i2} : Received Voltage
- V_{i3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3} : Resistance
- X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3} : Reactance
- f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3} : Dispersal Load Factor
- CAP_{T1}, CAP_{T2}, CAP_{B1} : Total Transformer Capacity of secondary substations
- CAP_{B2}, CAP_{B3} : Power Factor
- cosθ : Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

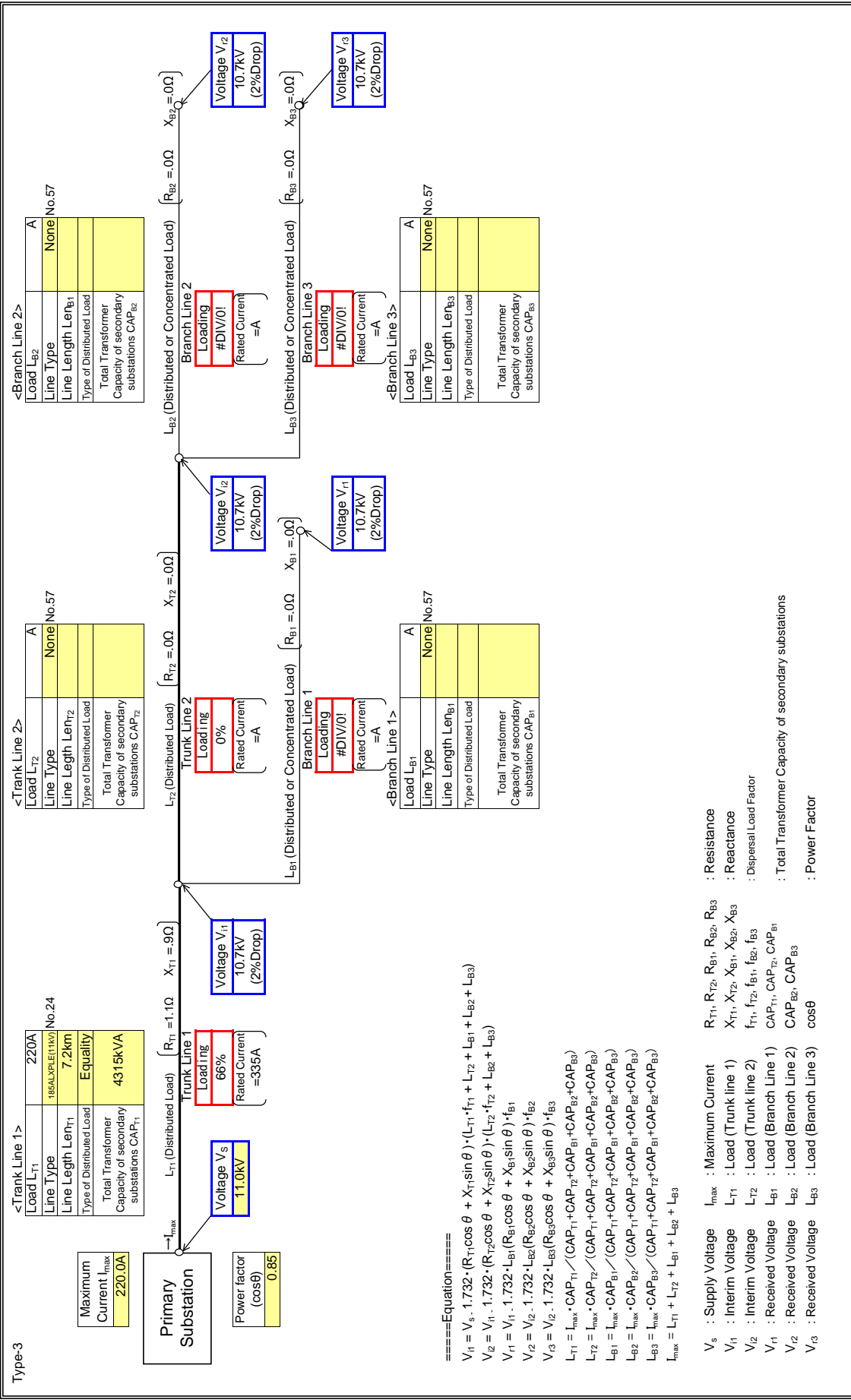
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

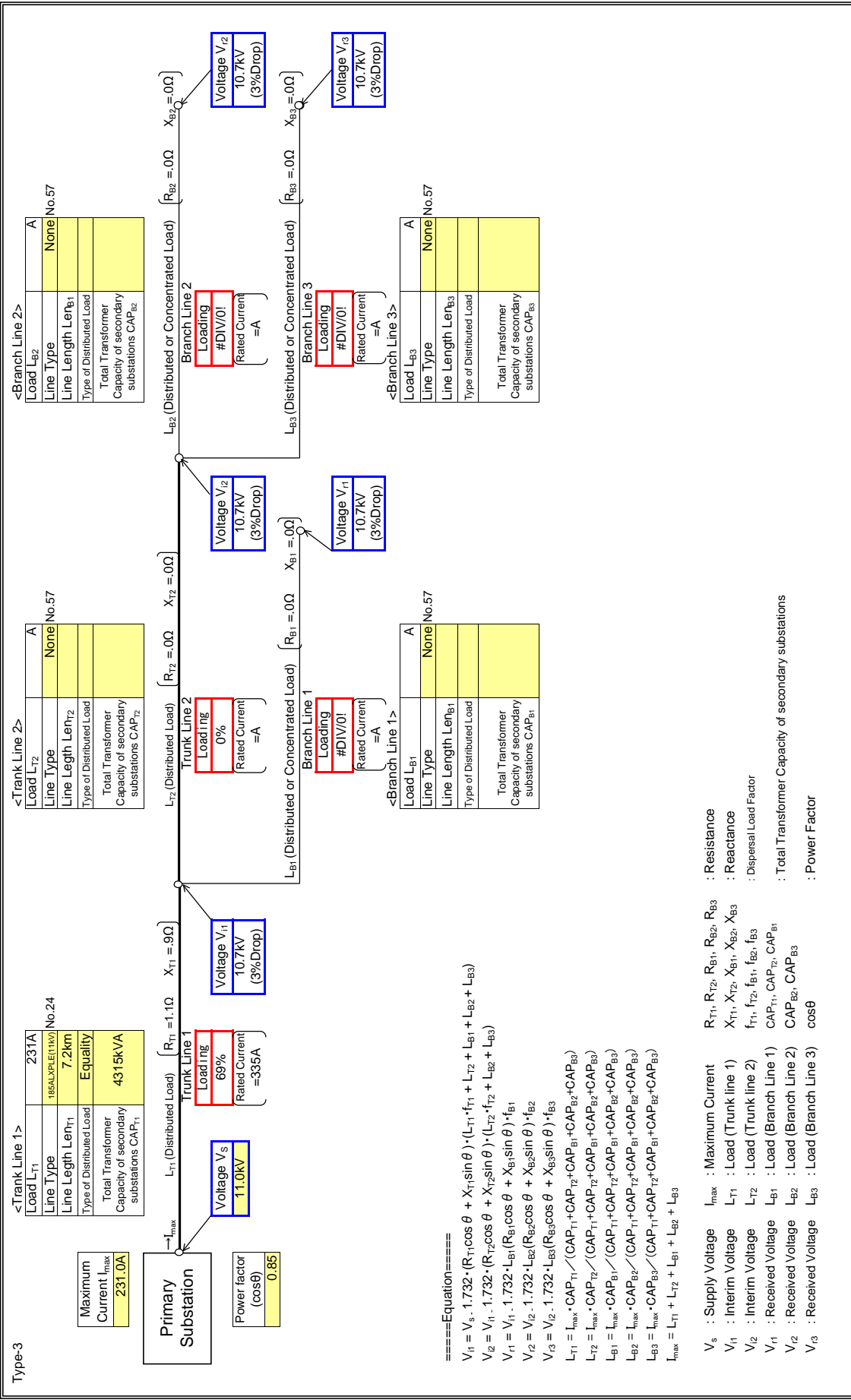
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

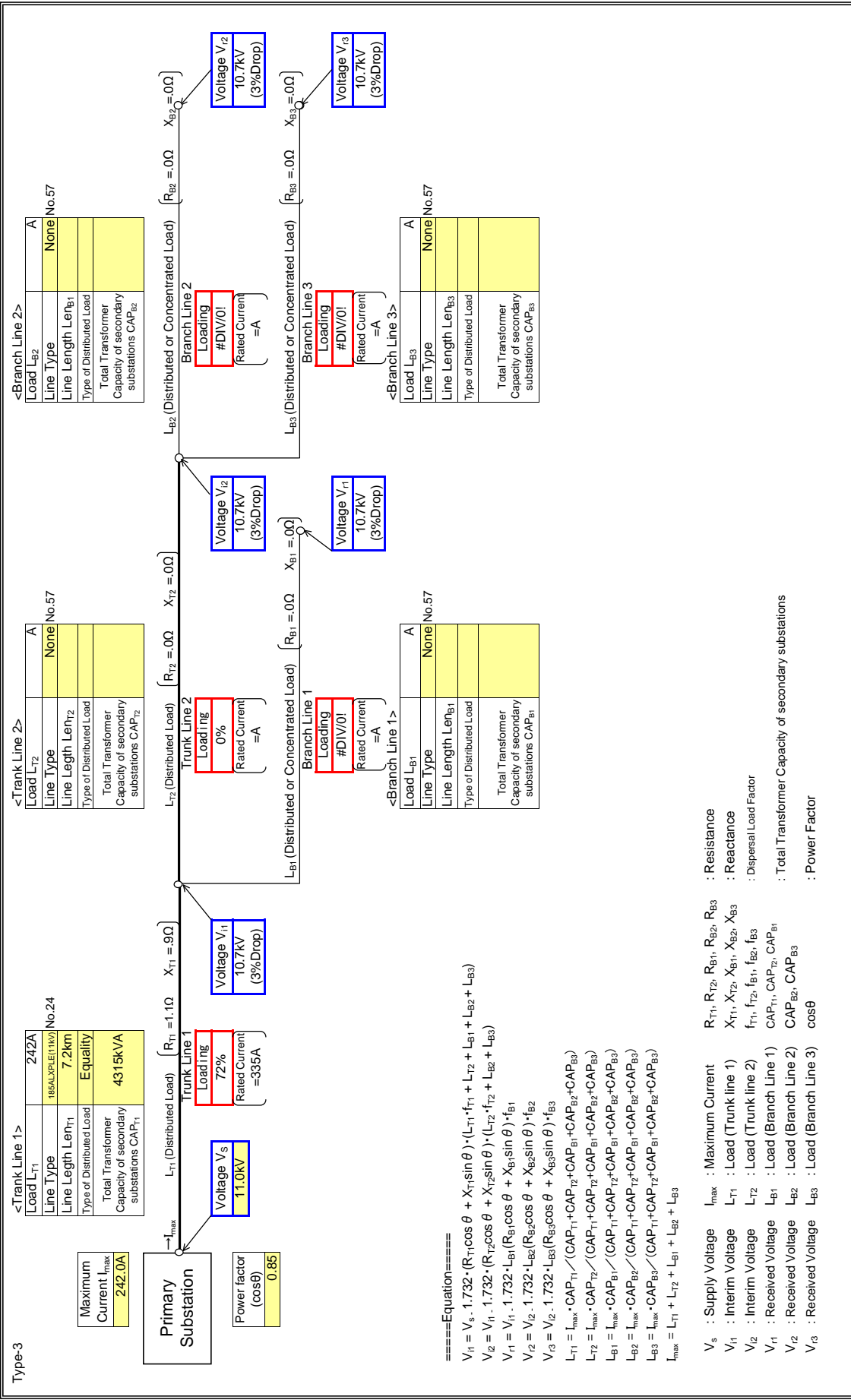
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

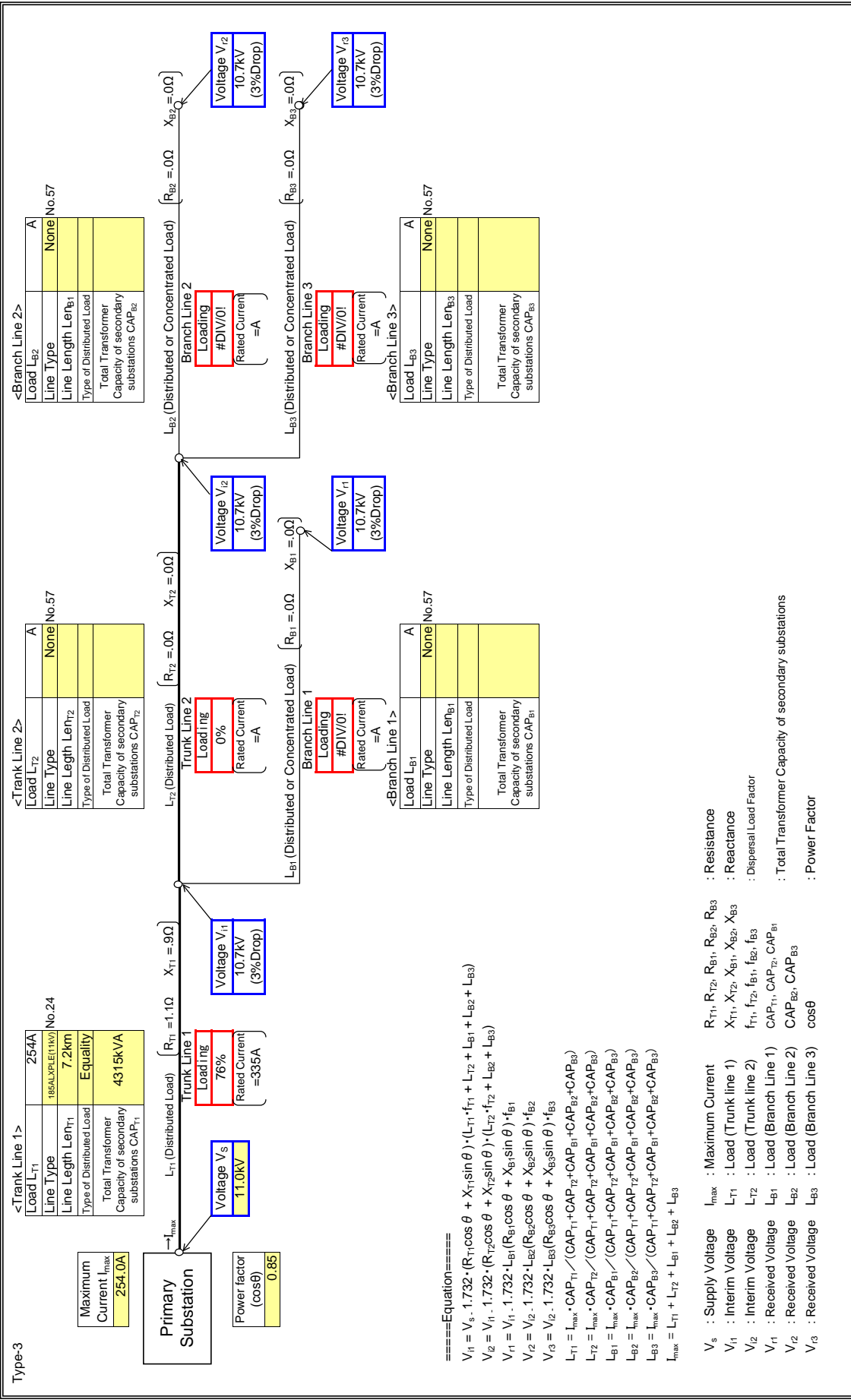
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

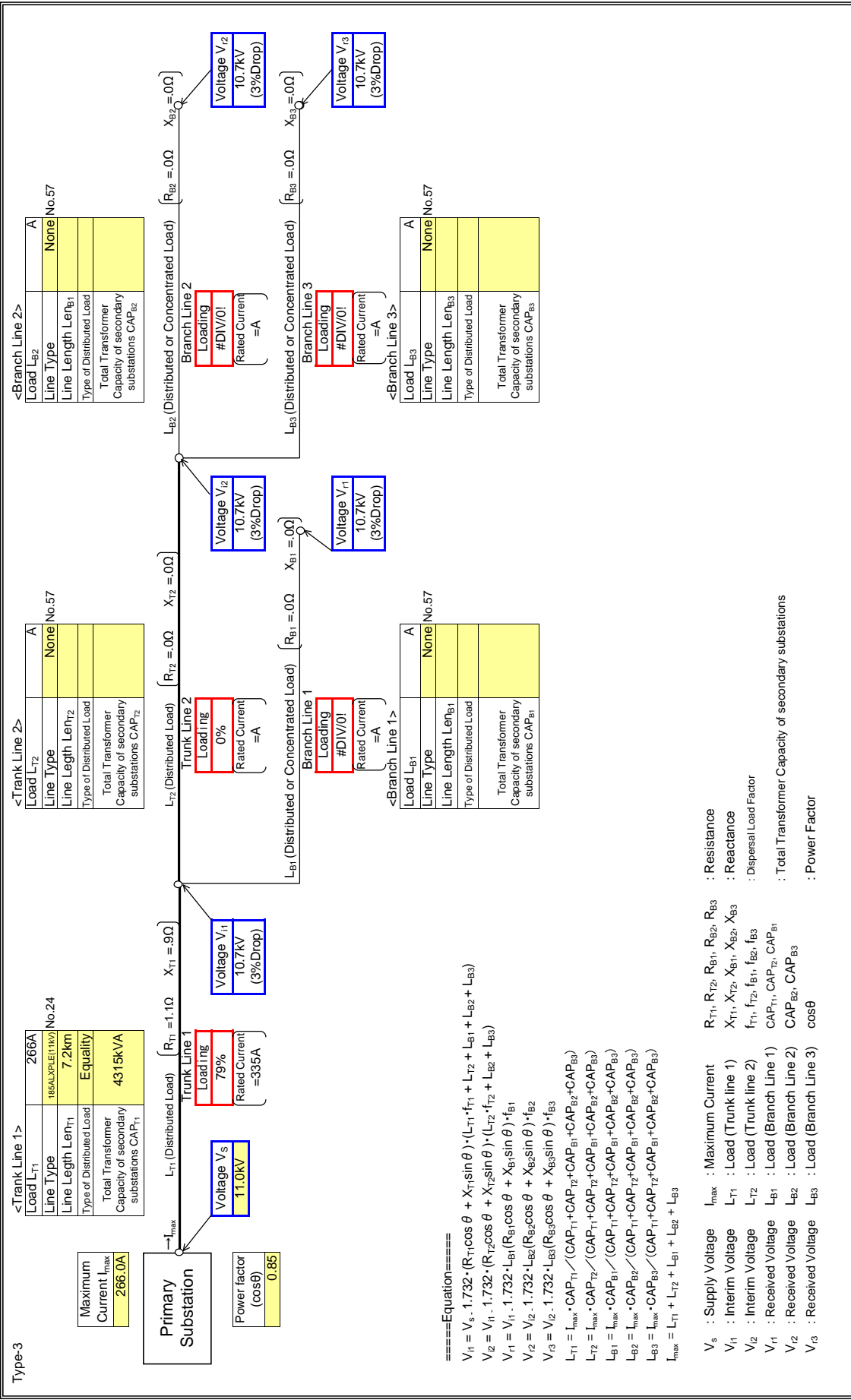
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

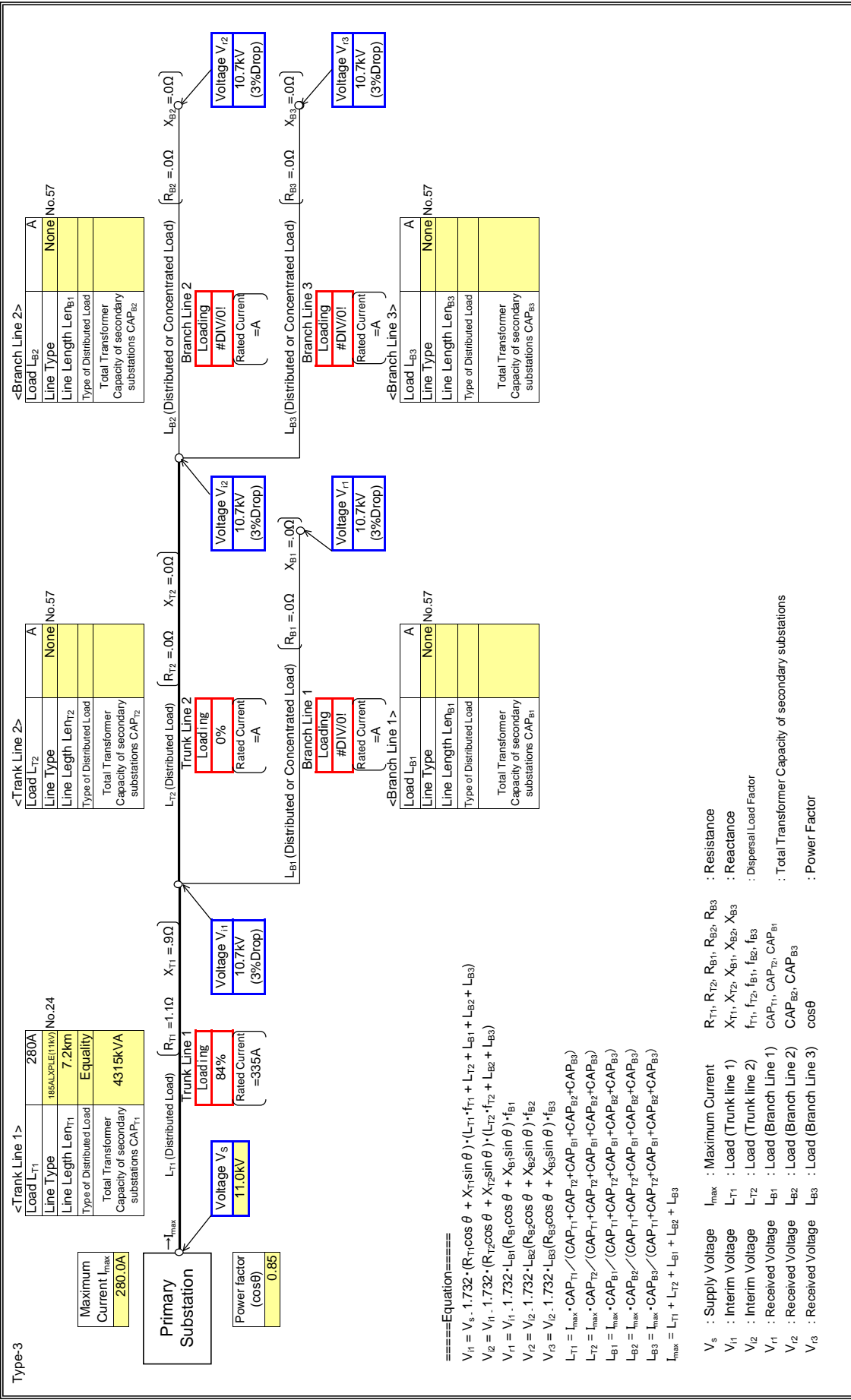
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

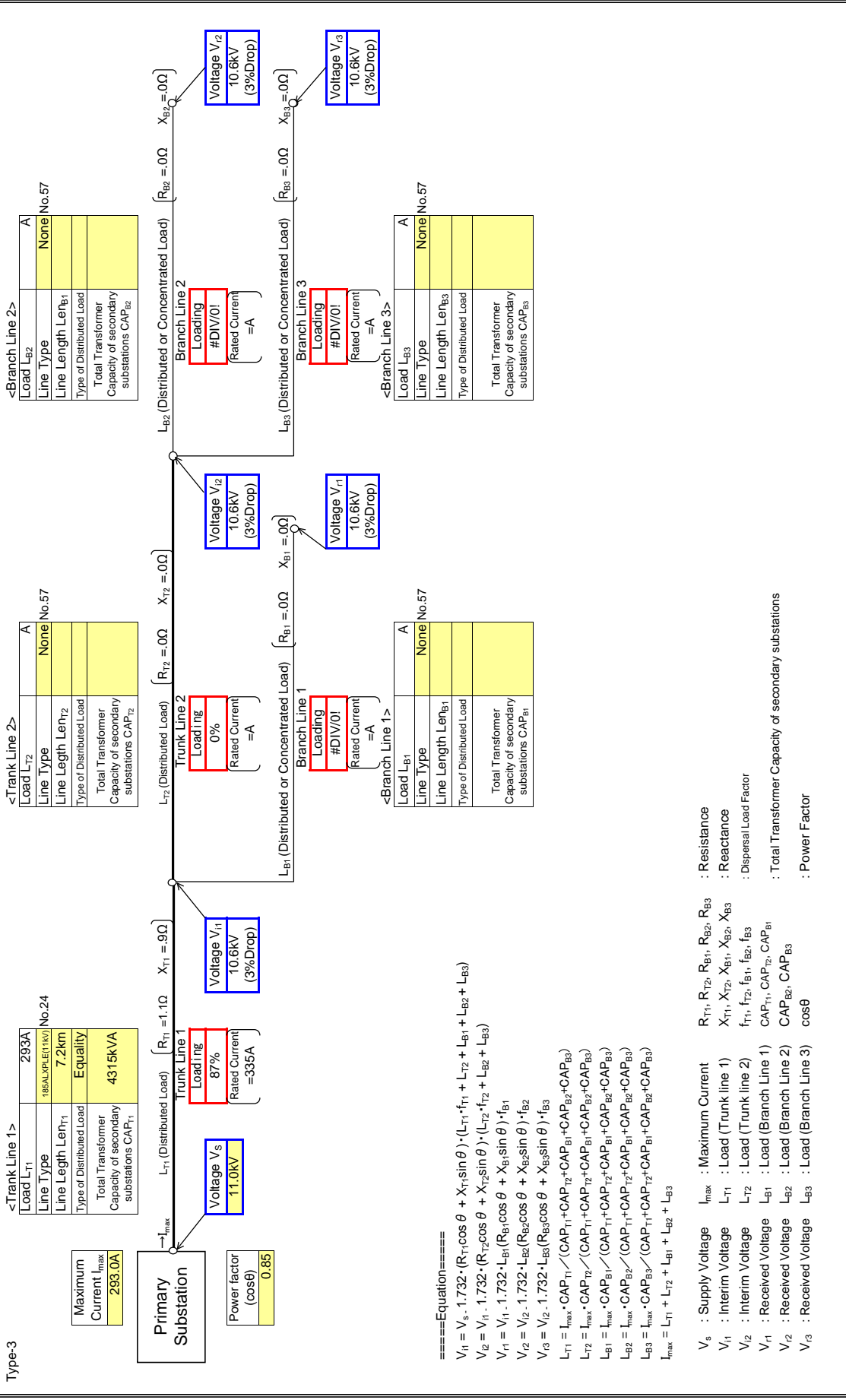
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

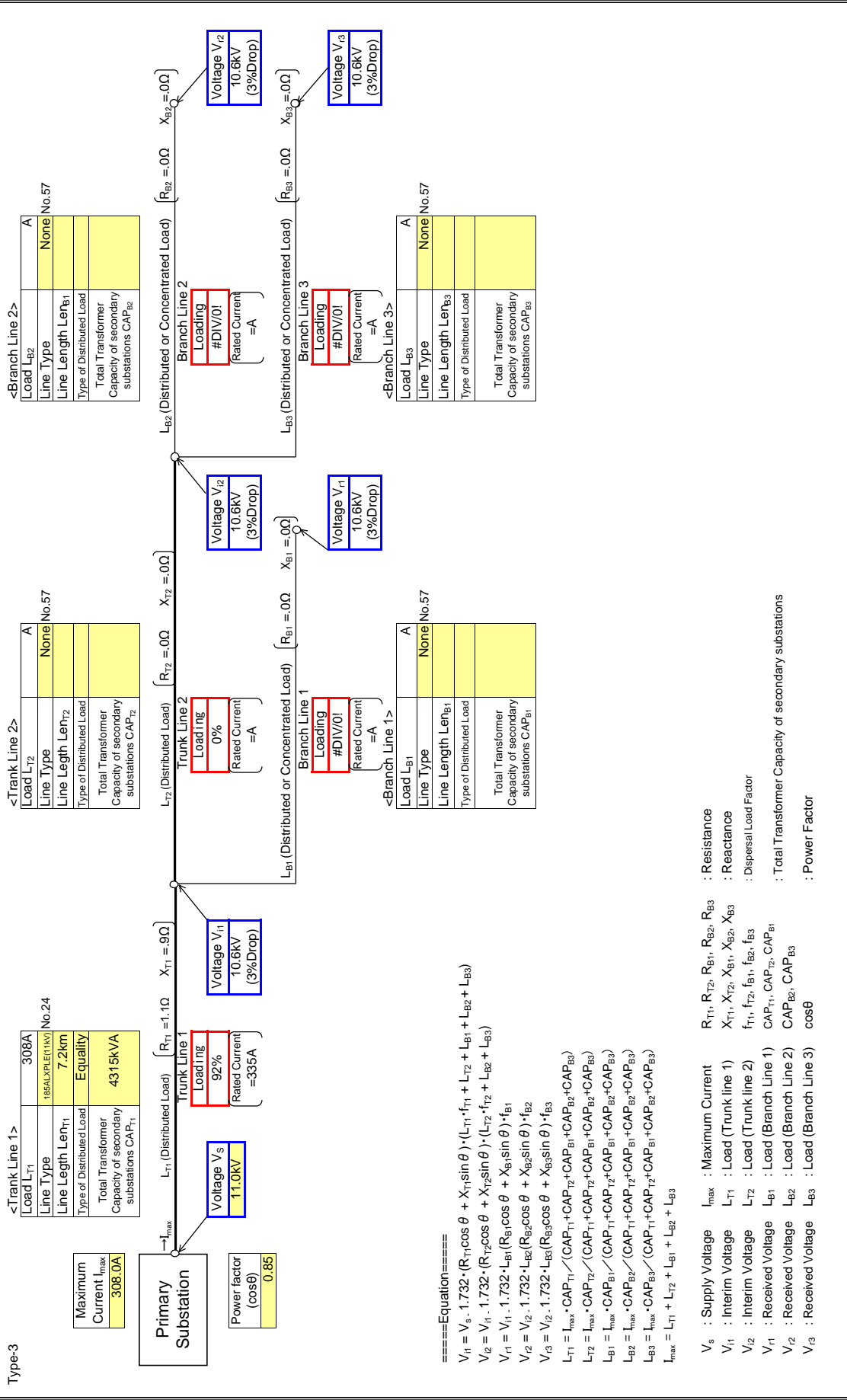
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

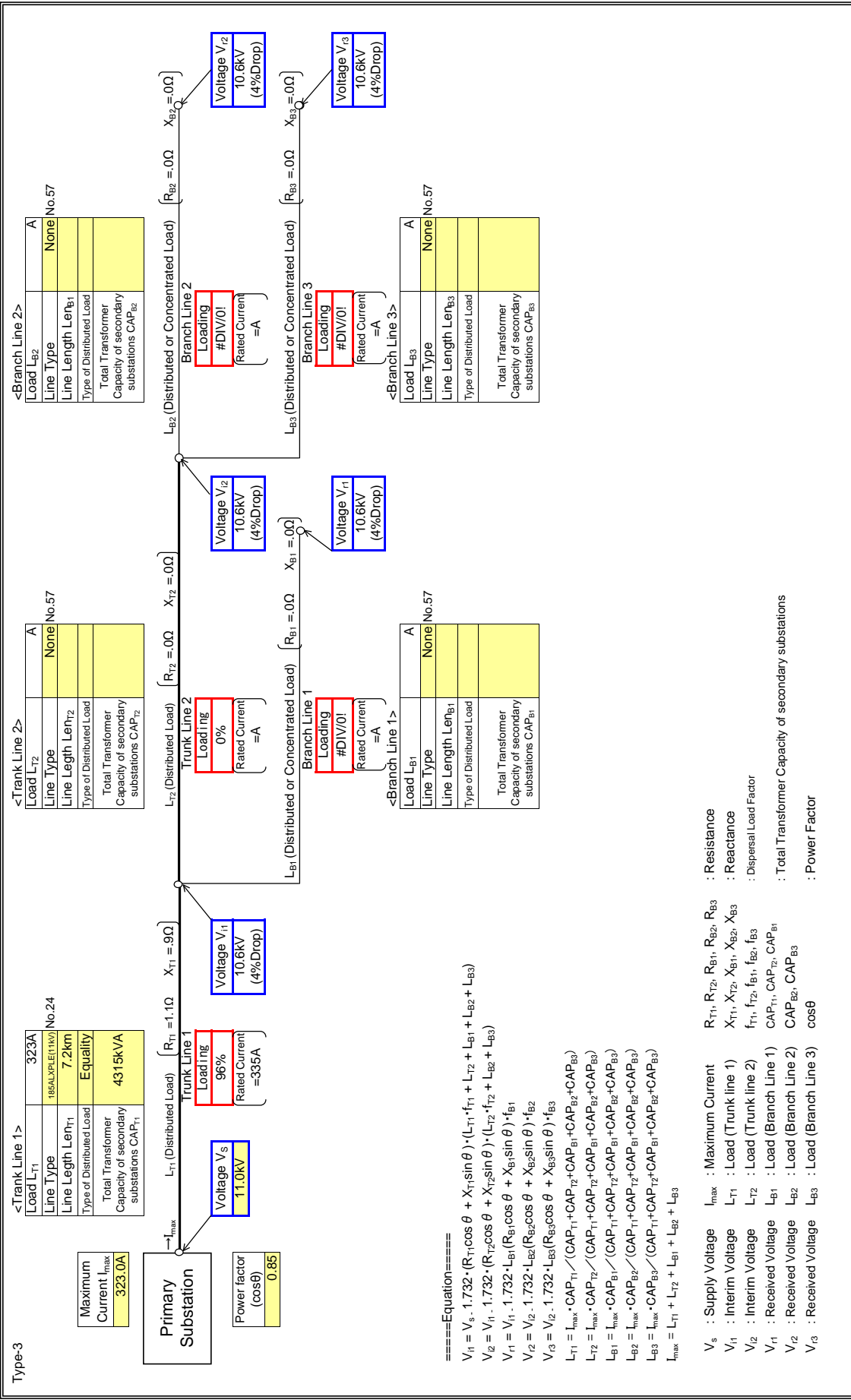
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

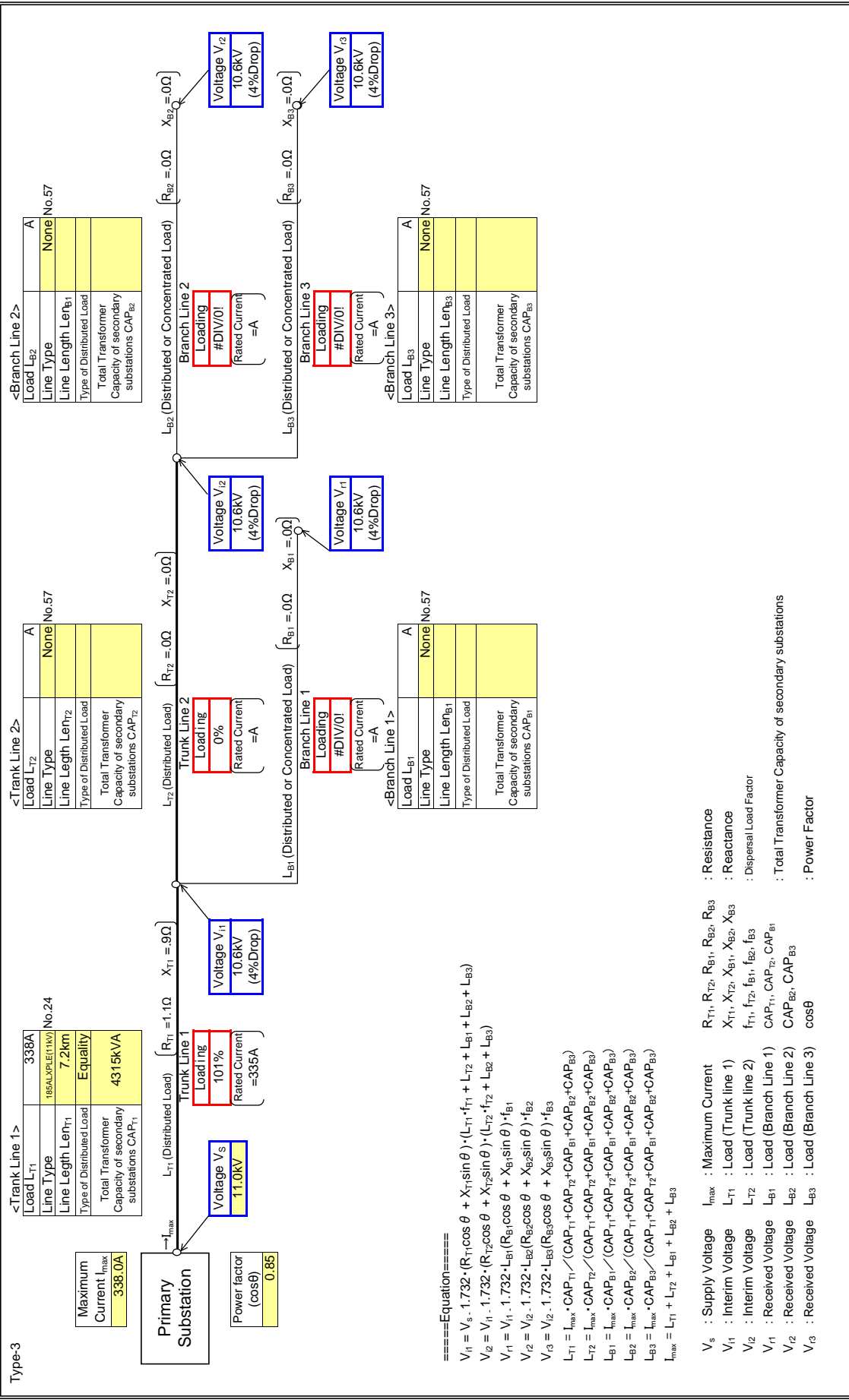
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R3

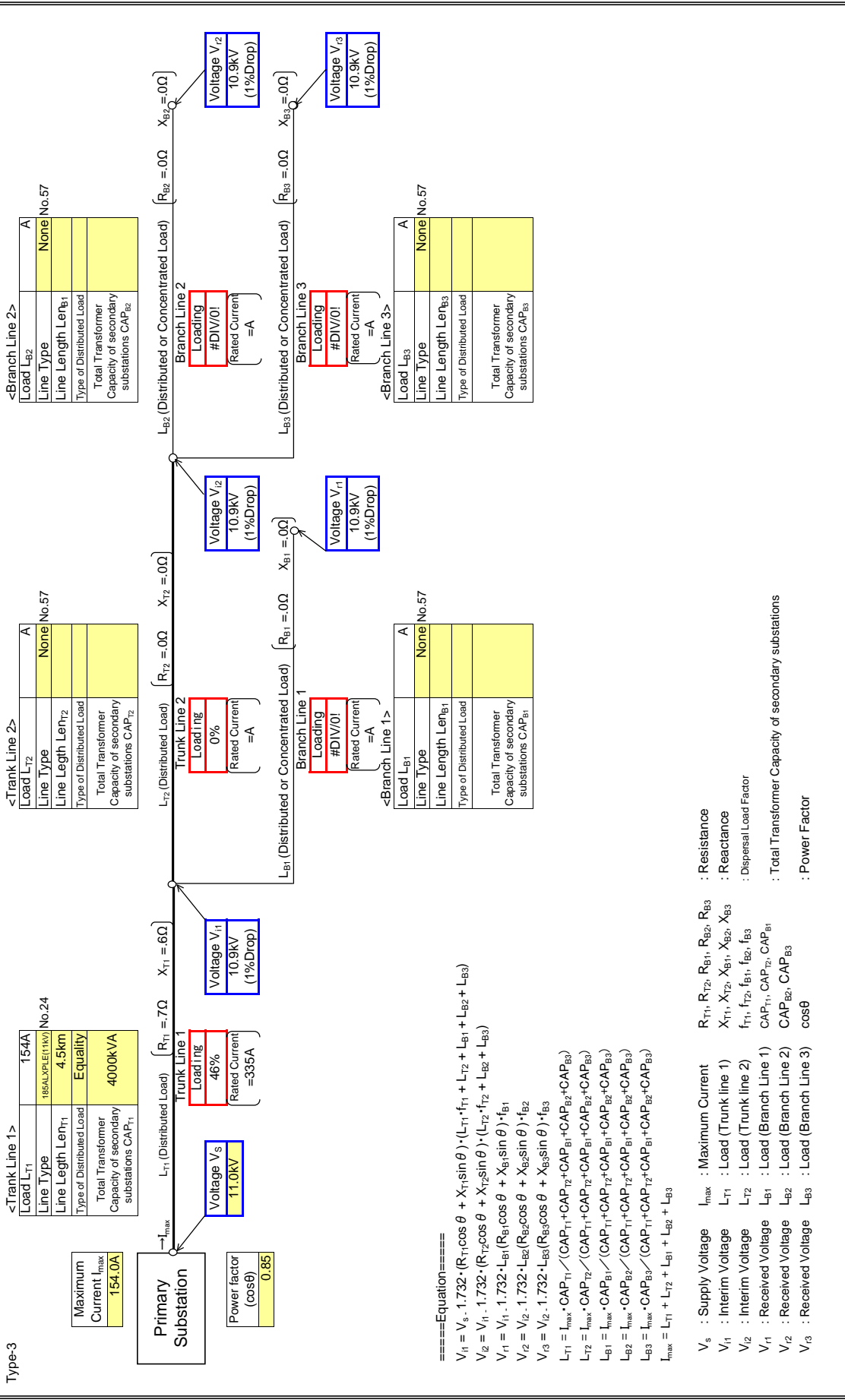
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

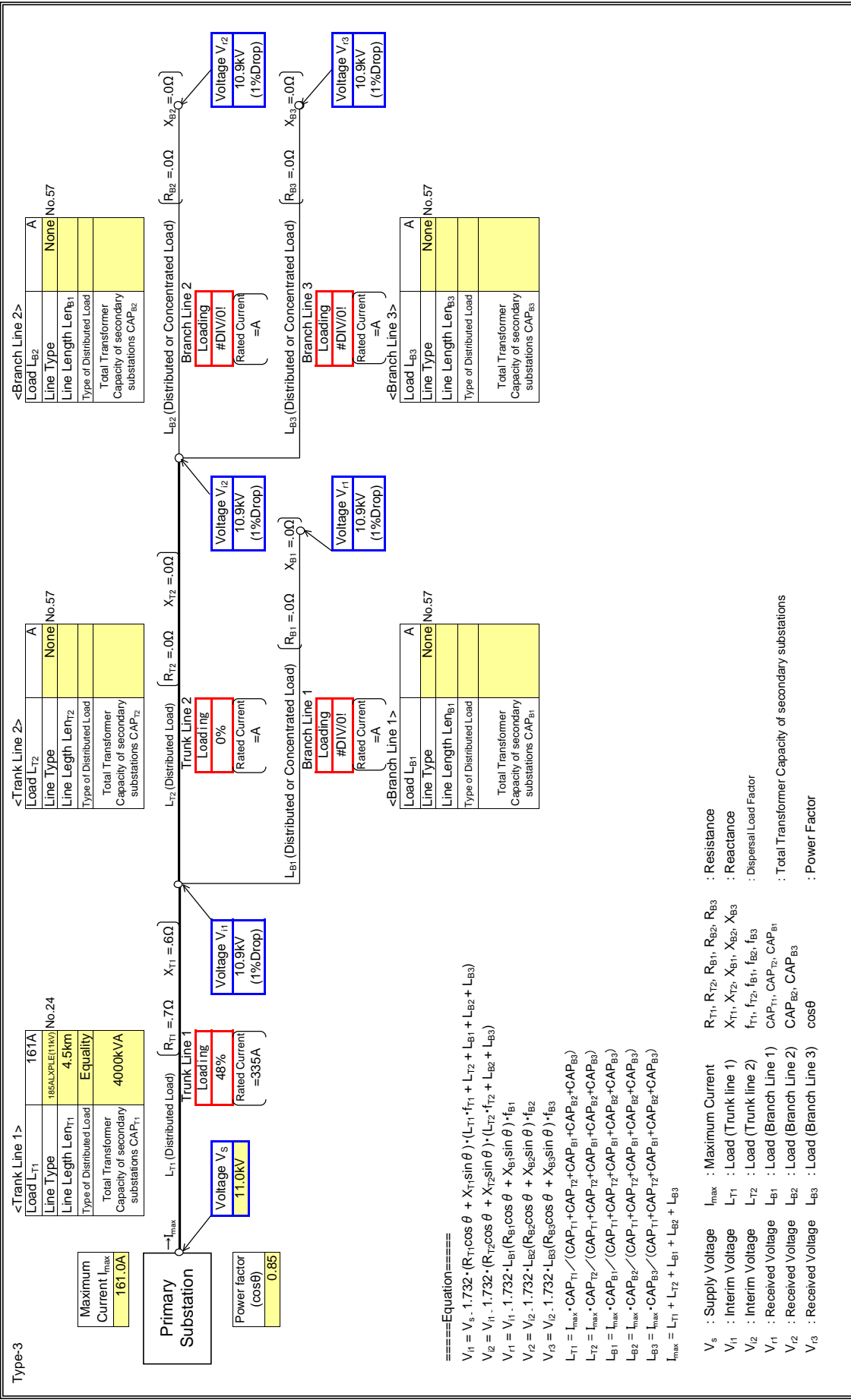
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

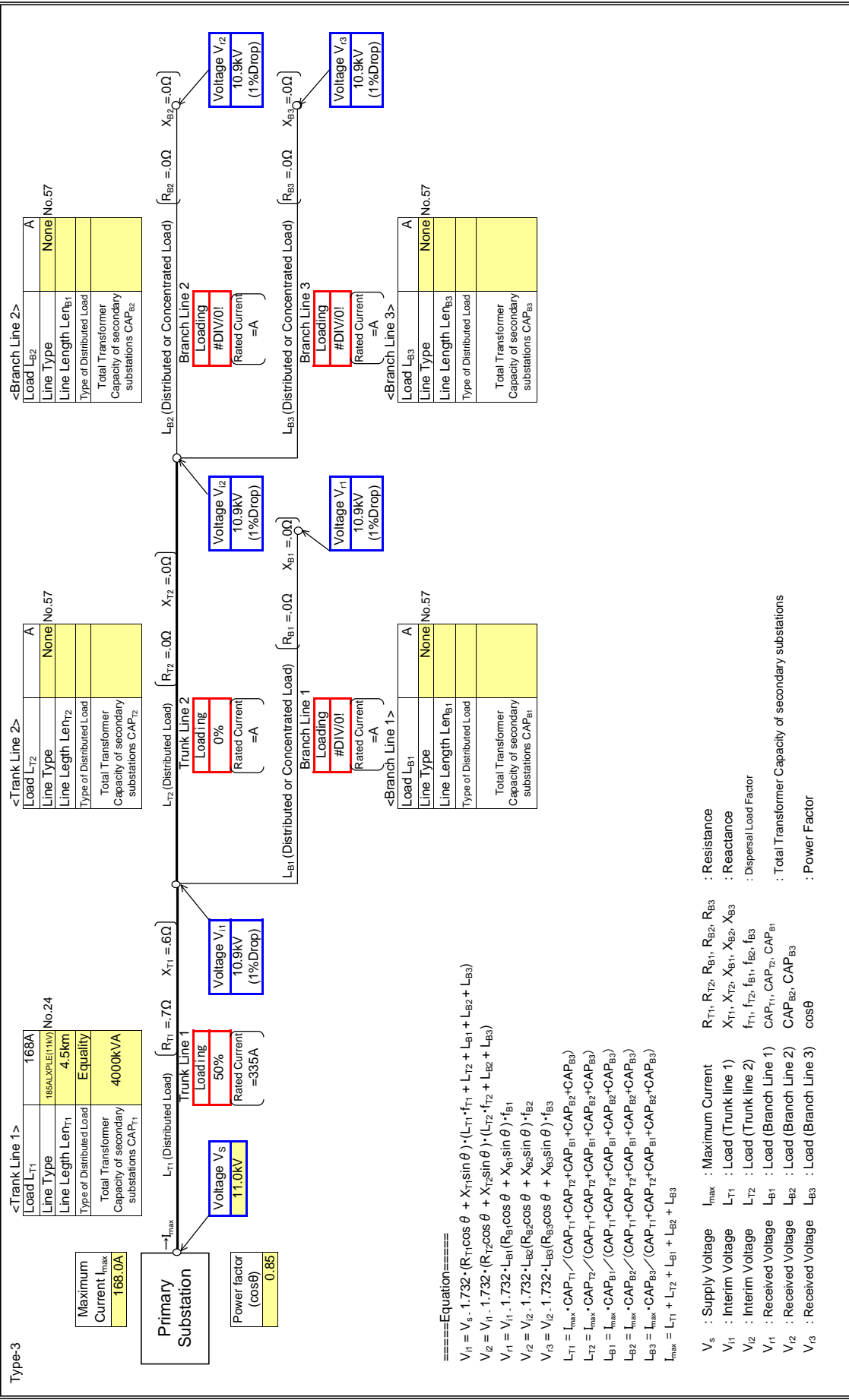
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

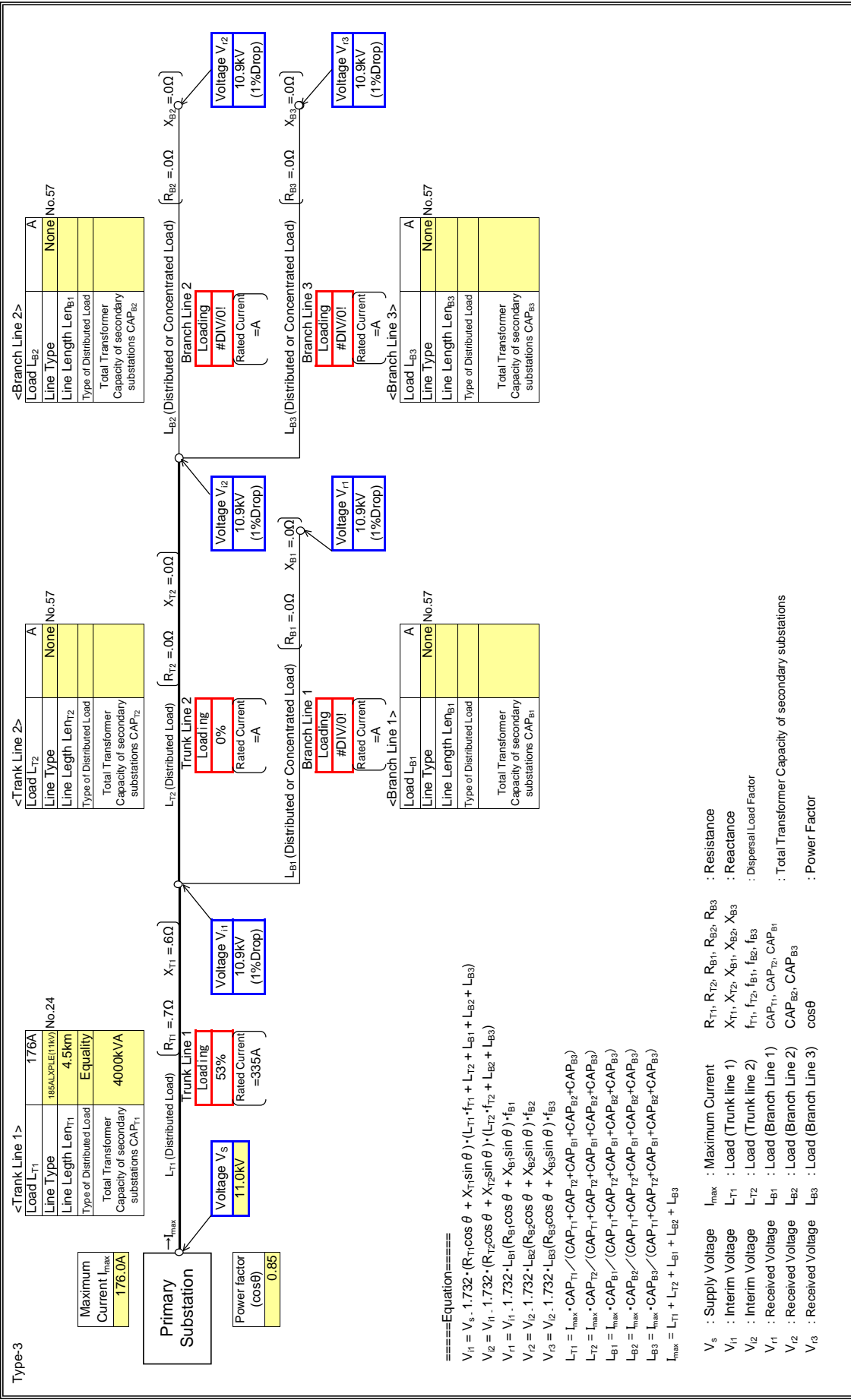
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

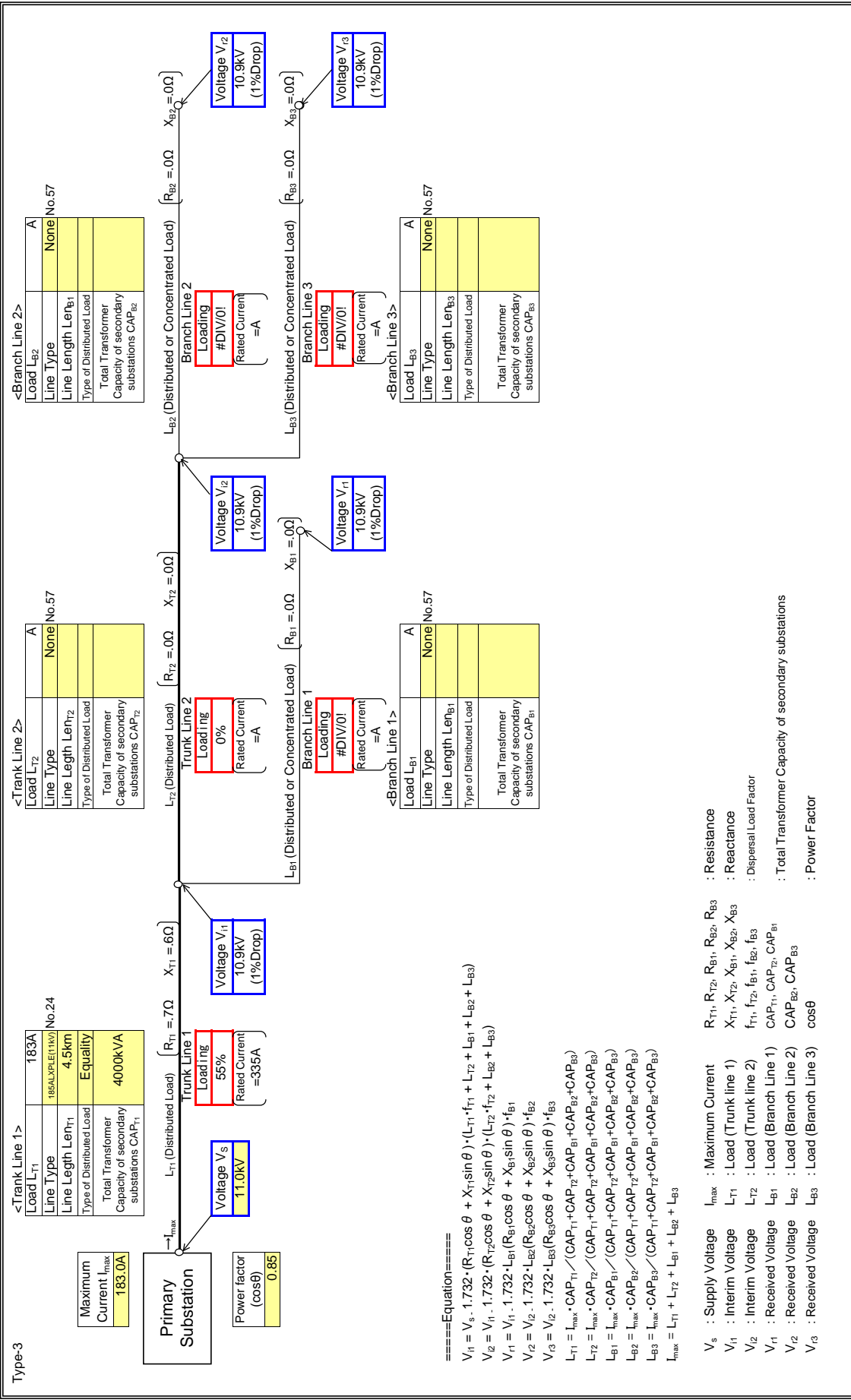
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

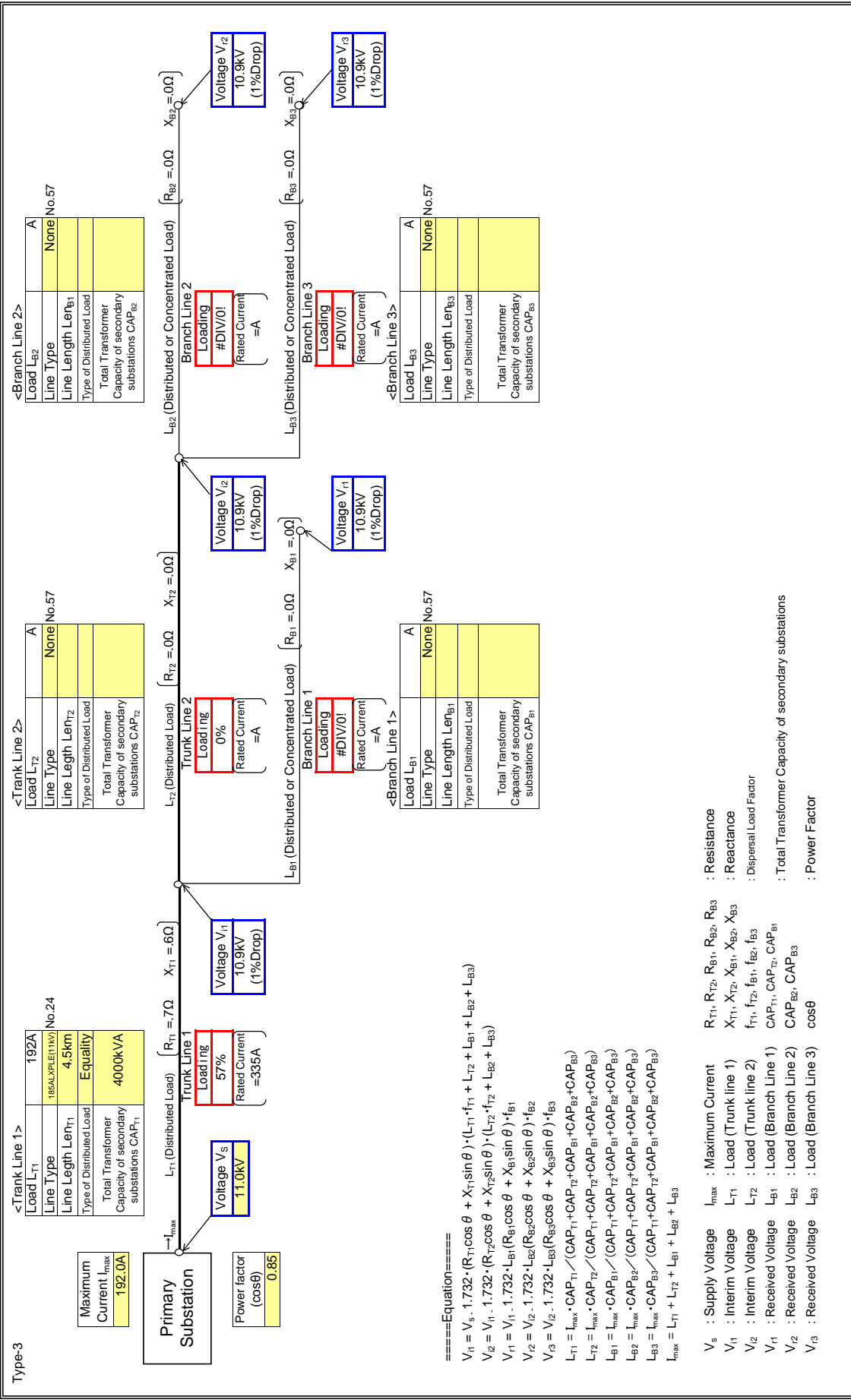
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

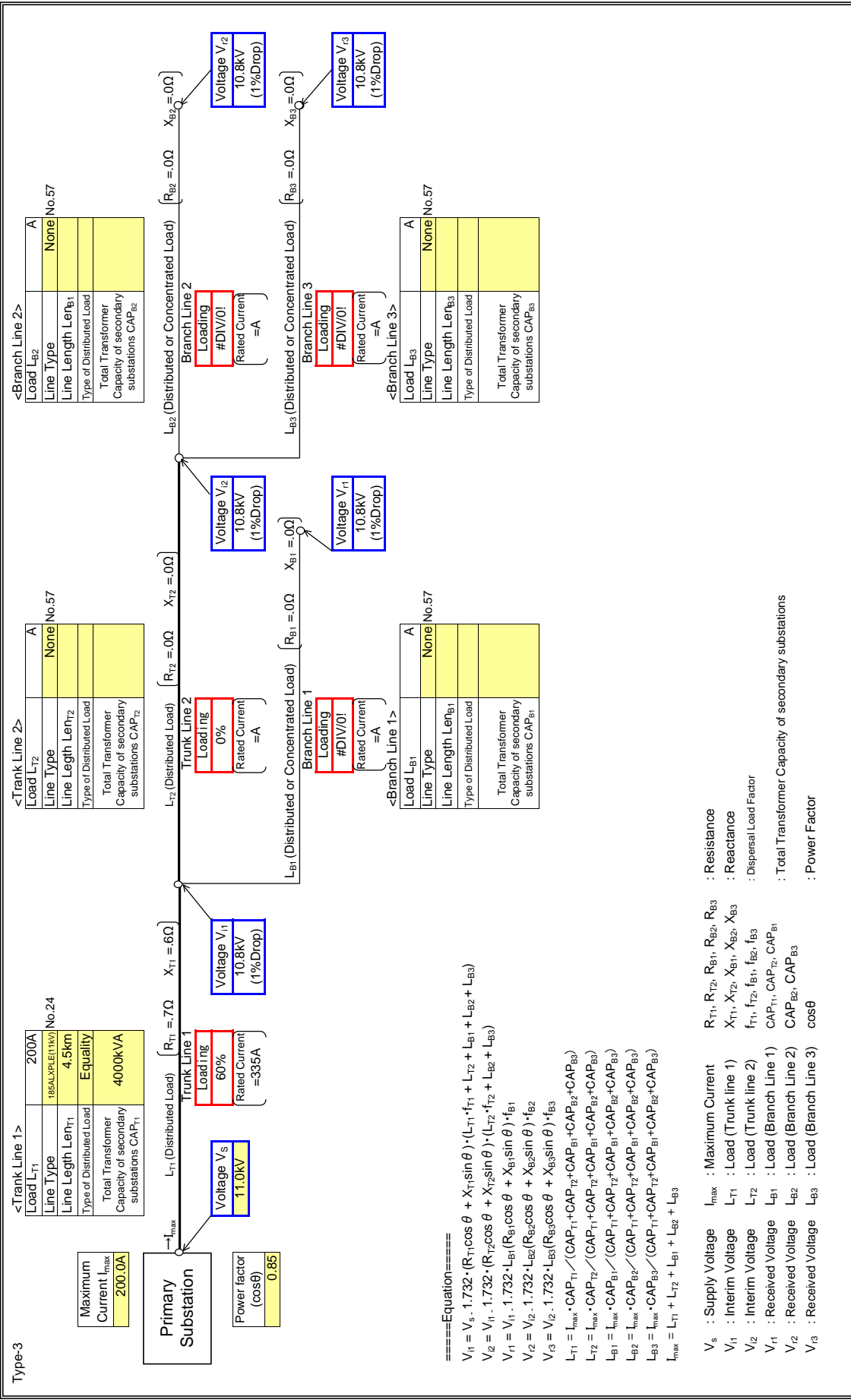
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

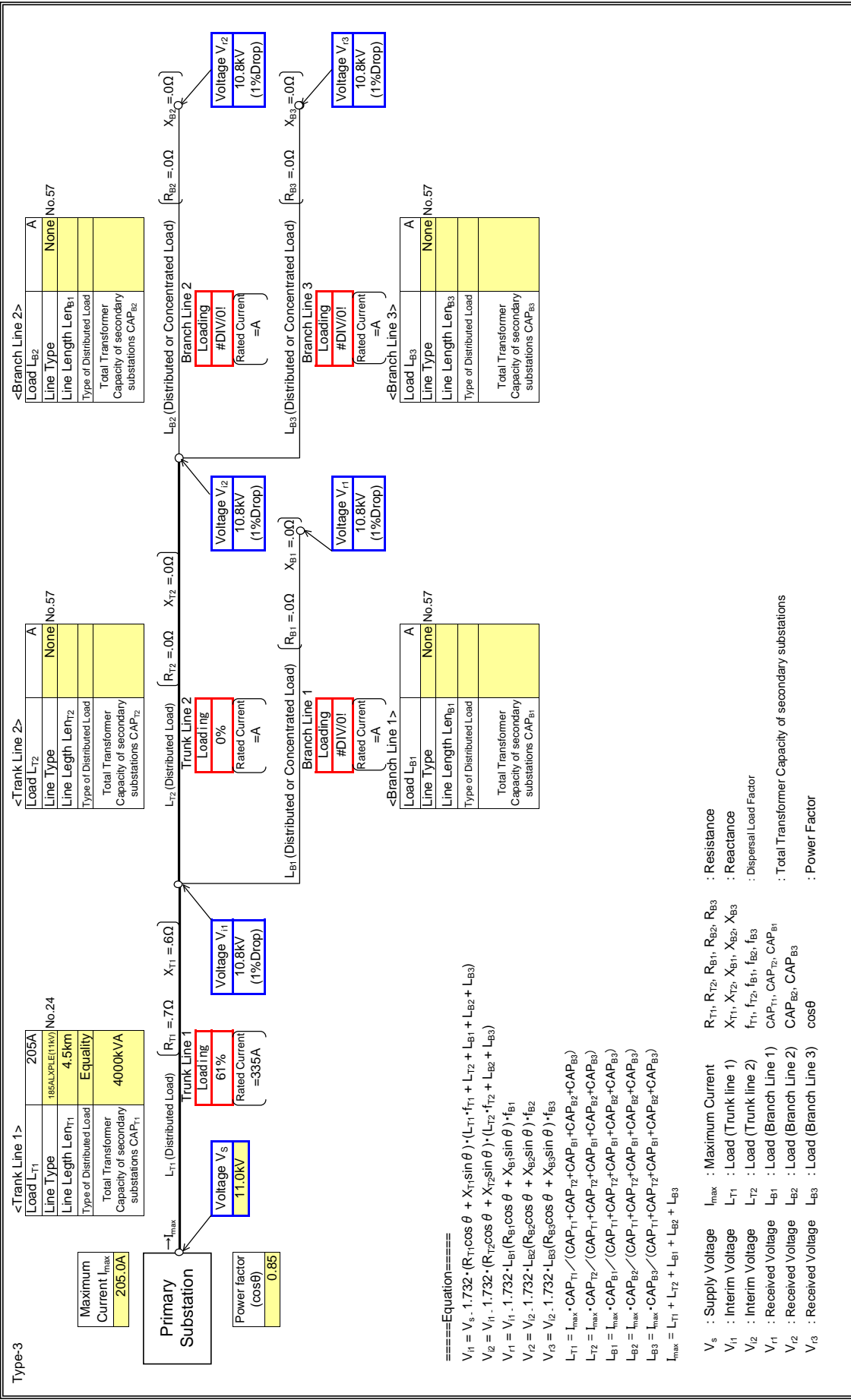
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

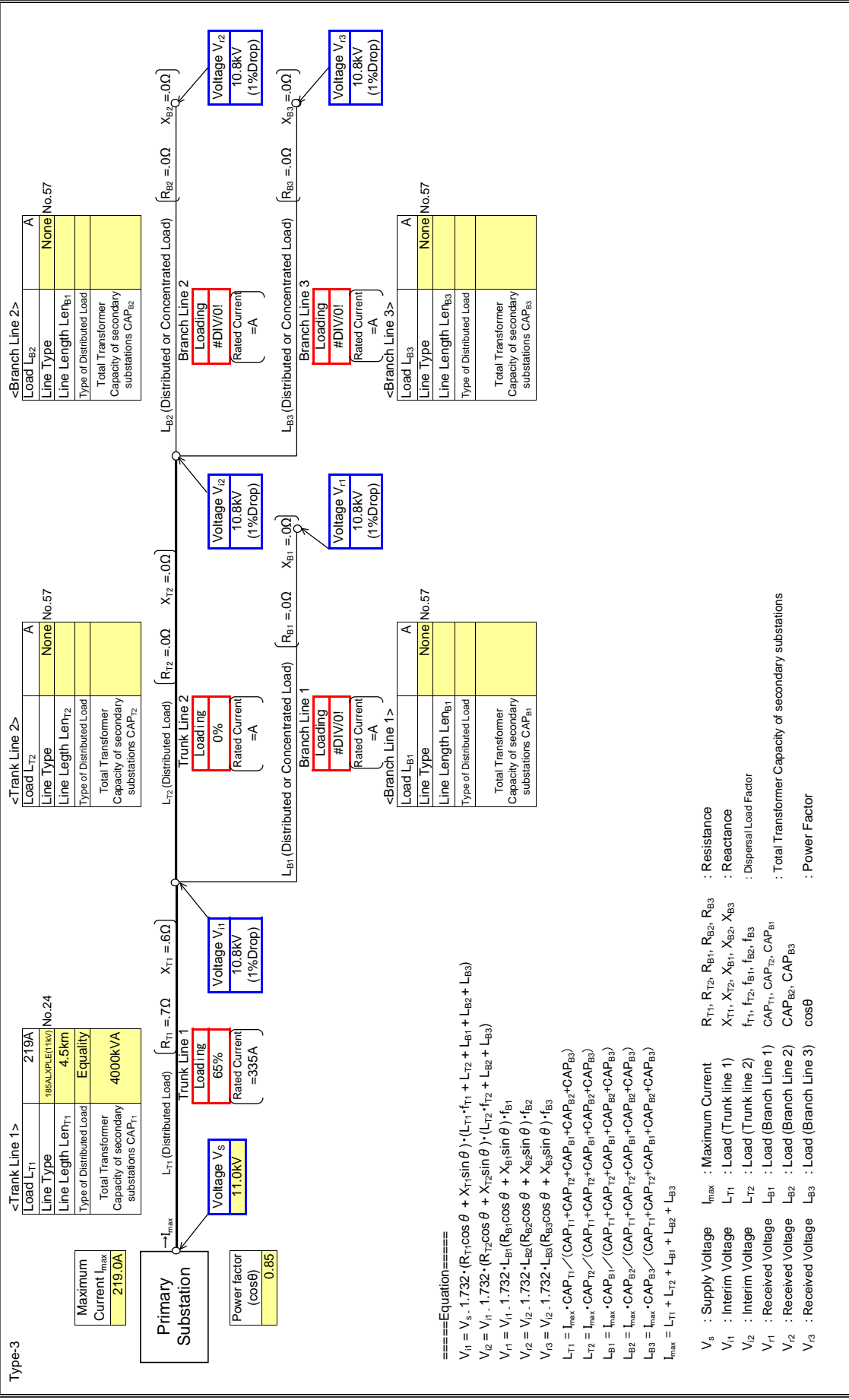
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

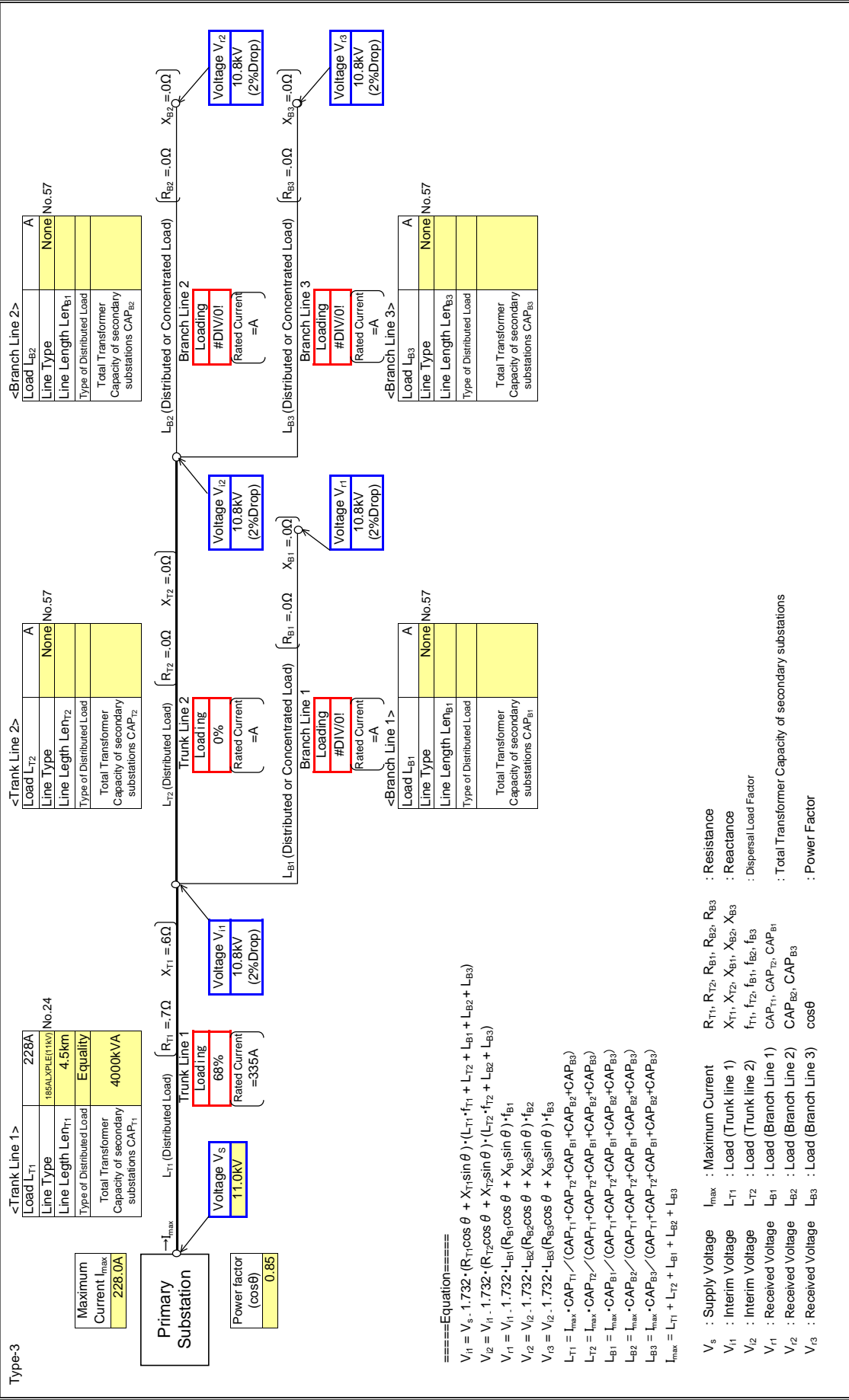
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

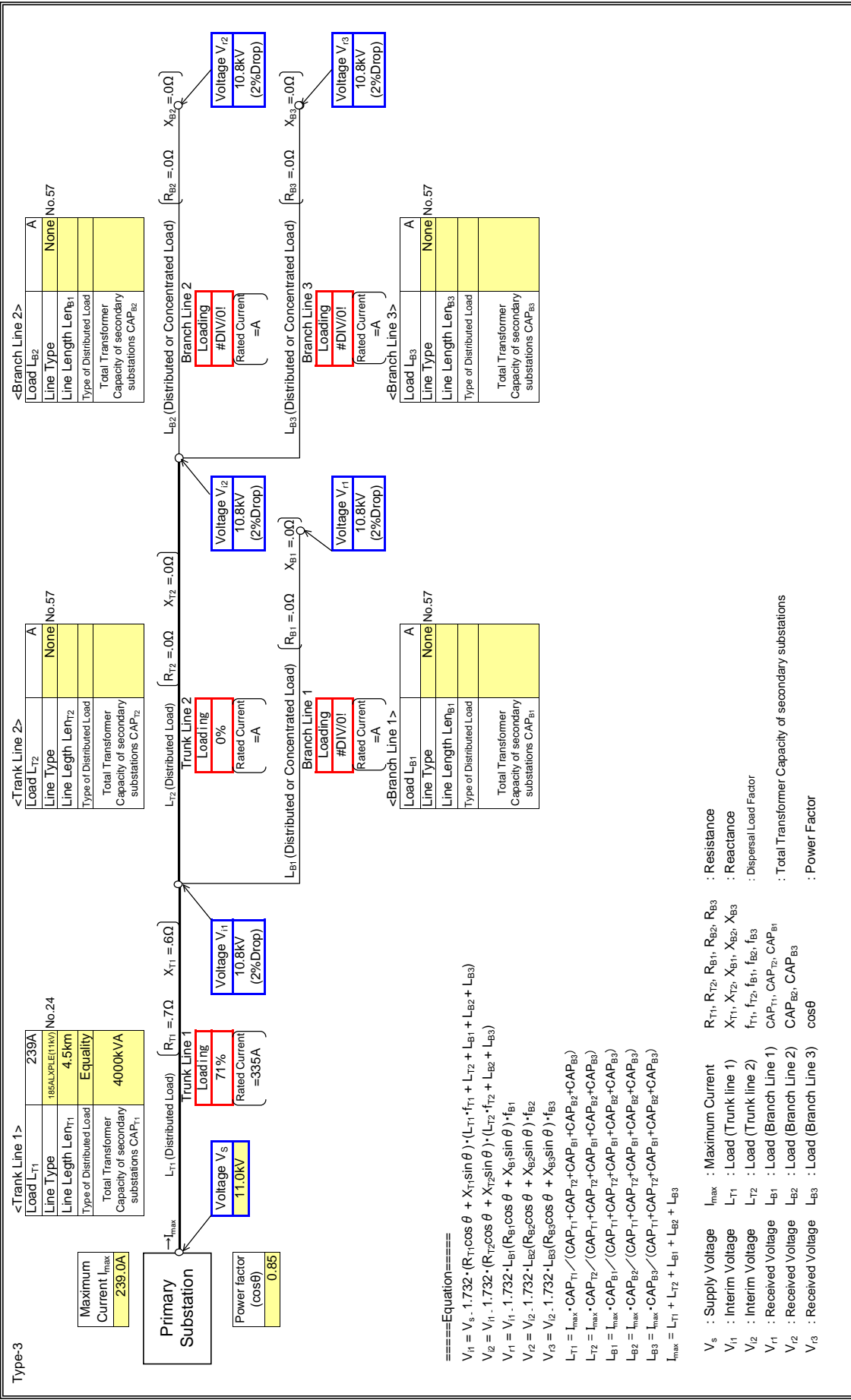
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

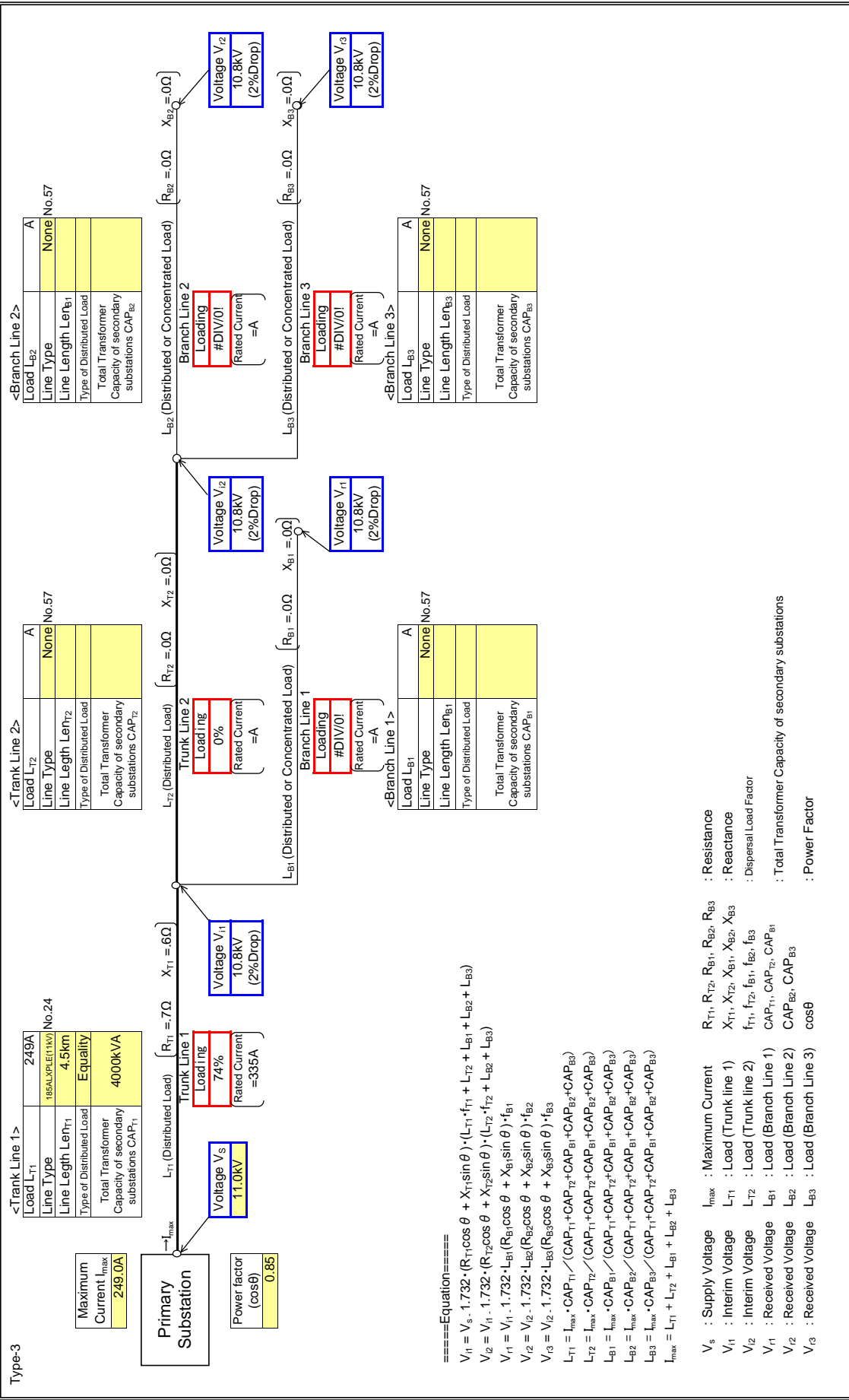
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R4

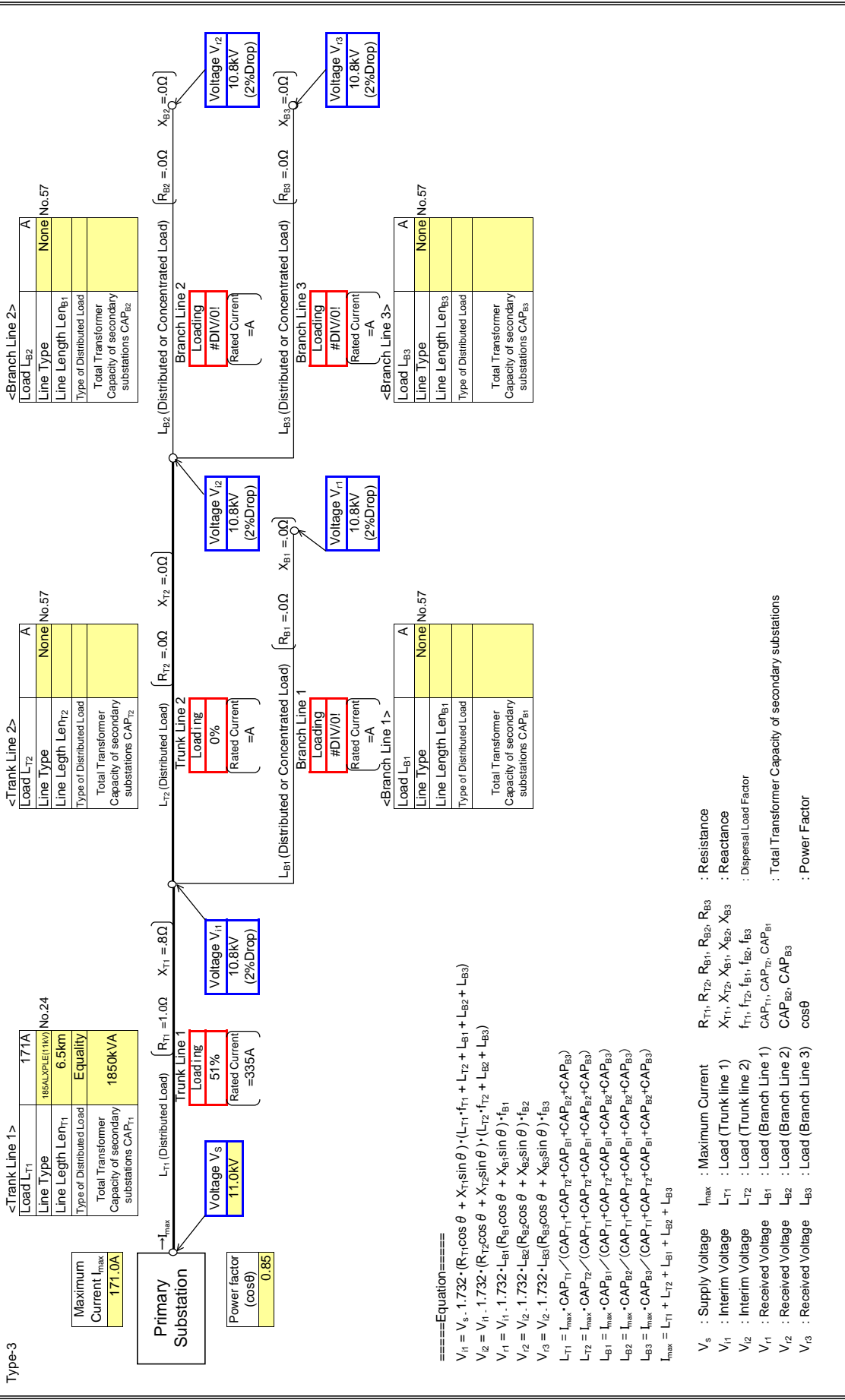
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

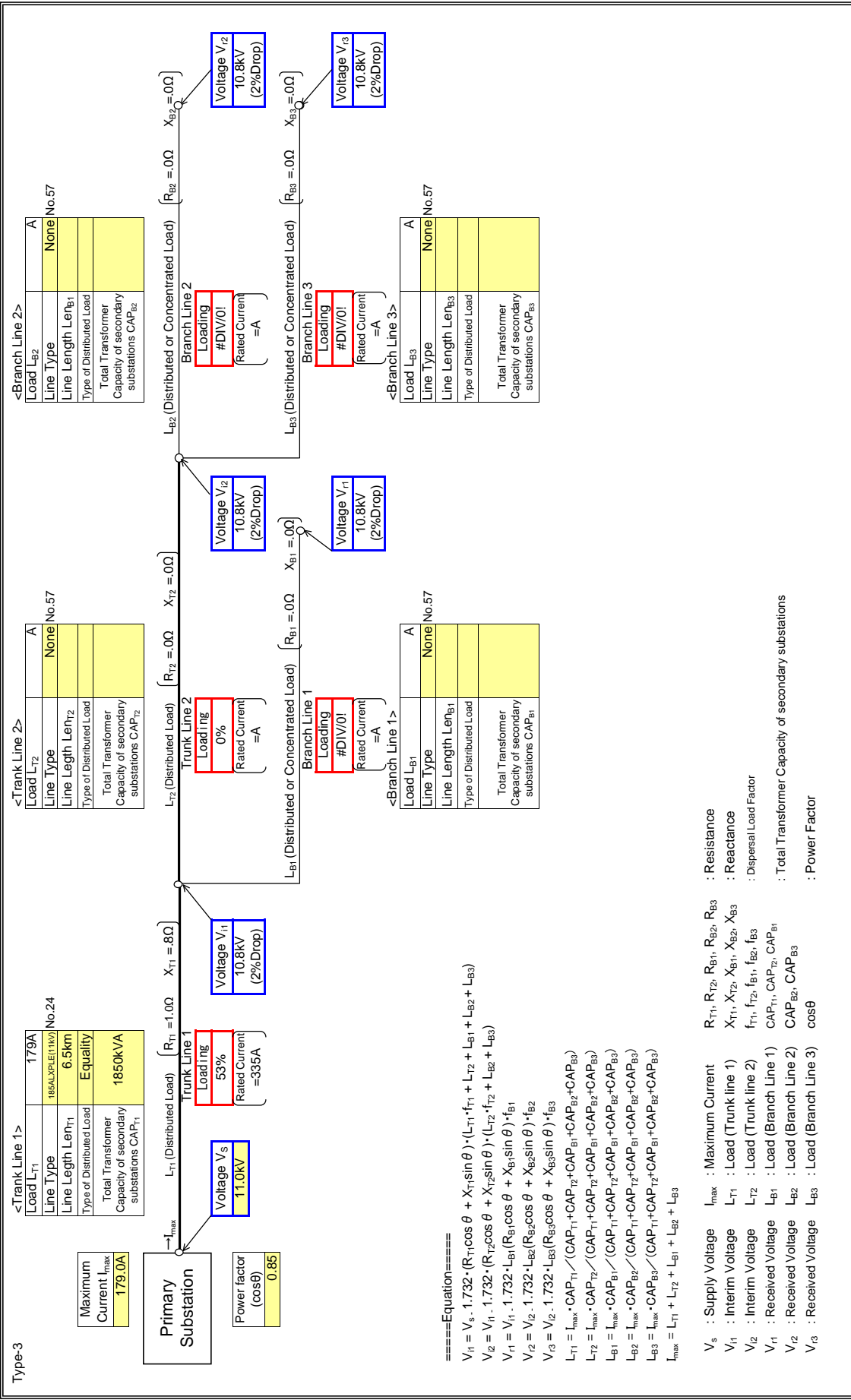
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

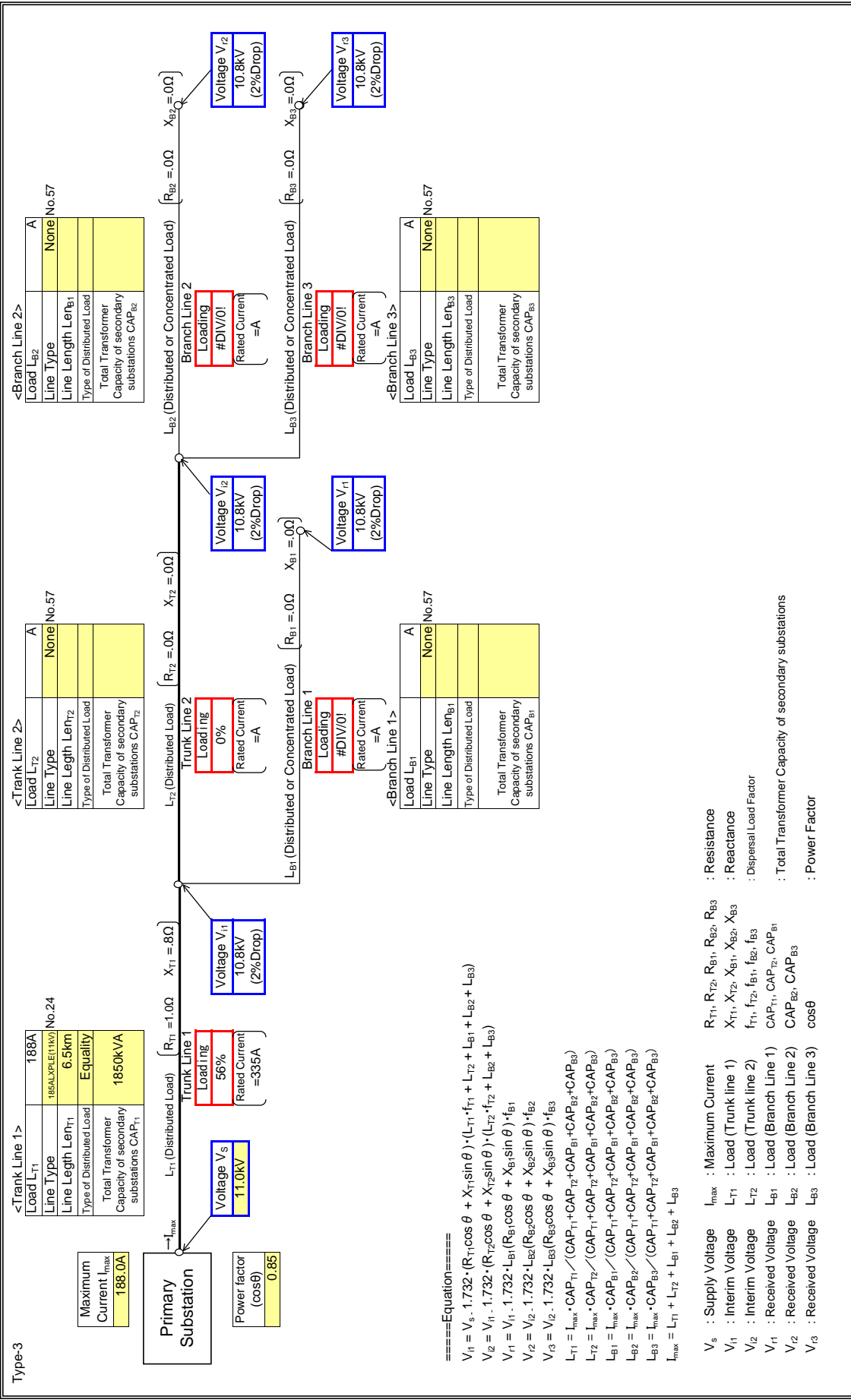
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

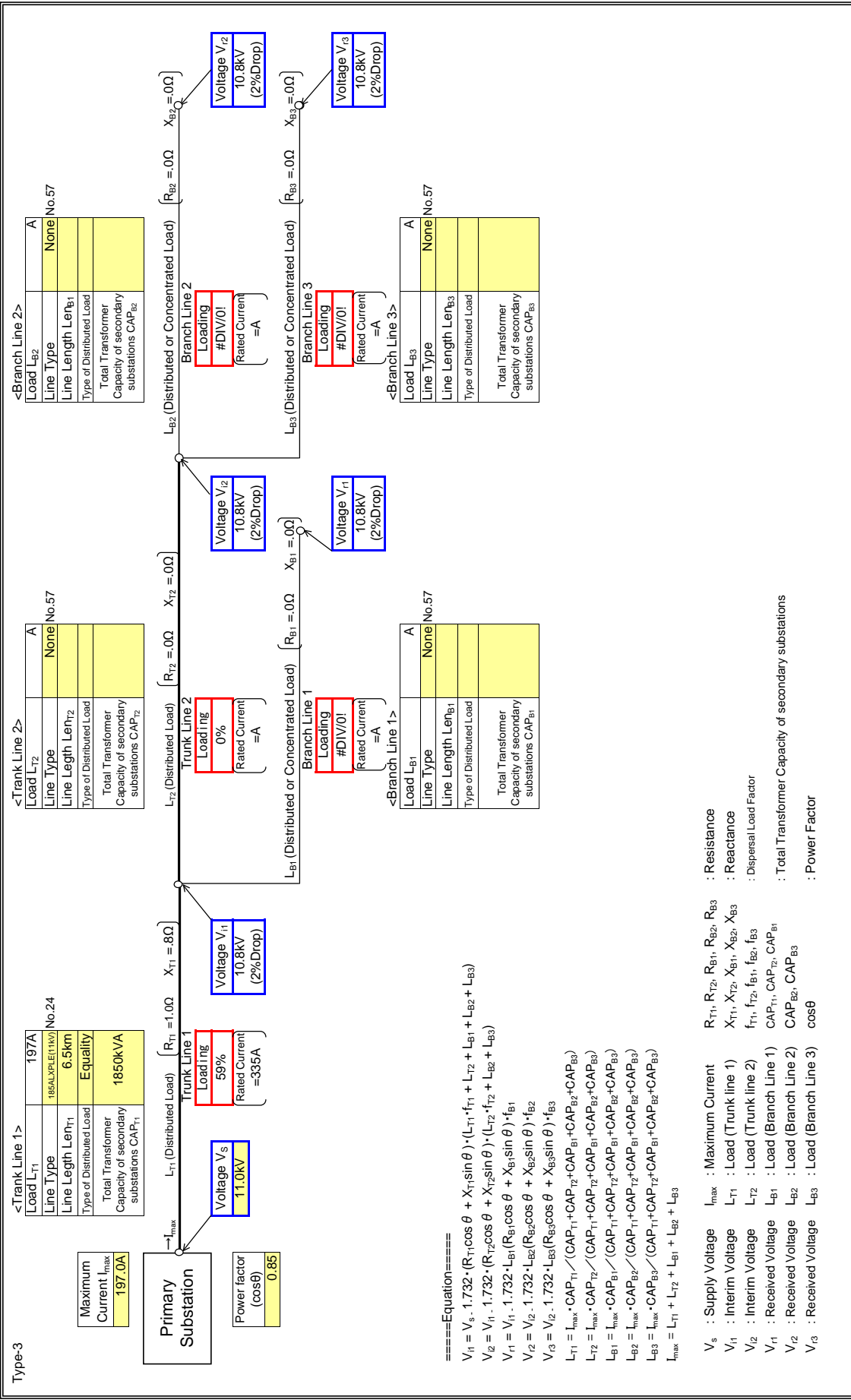
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

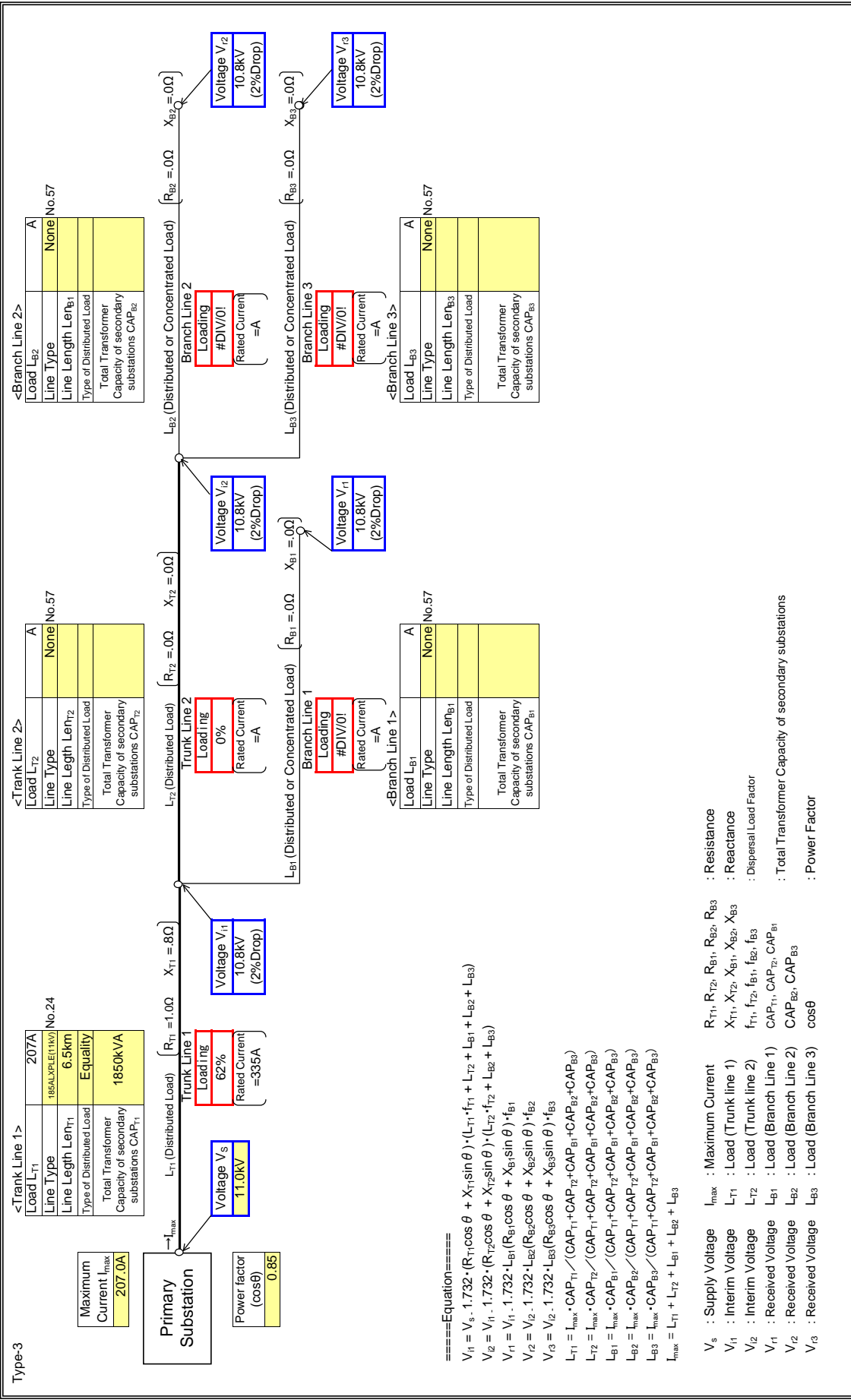
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

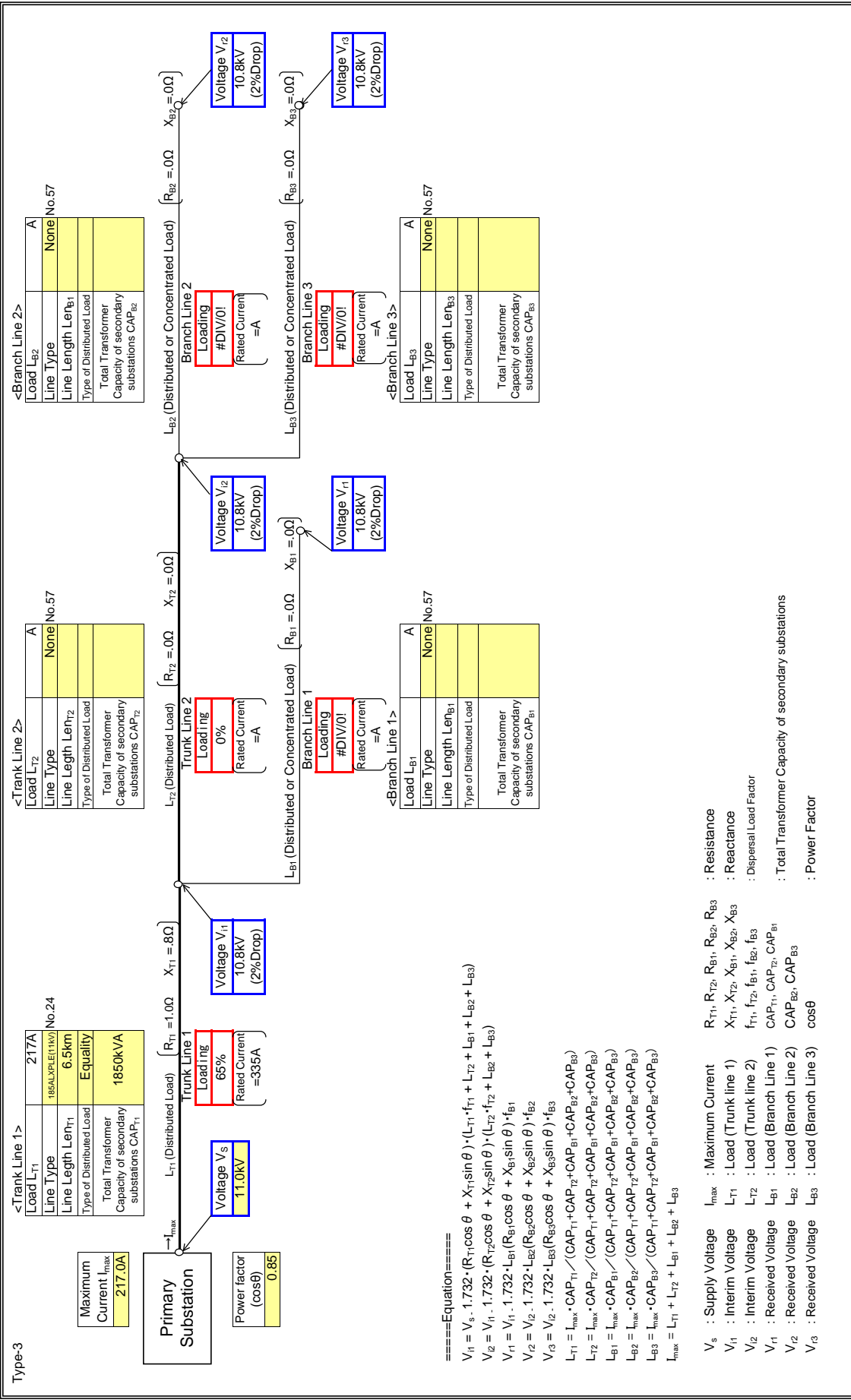
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

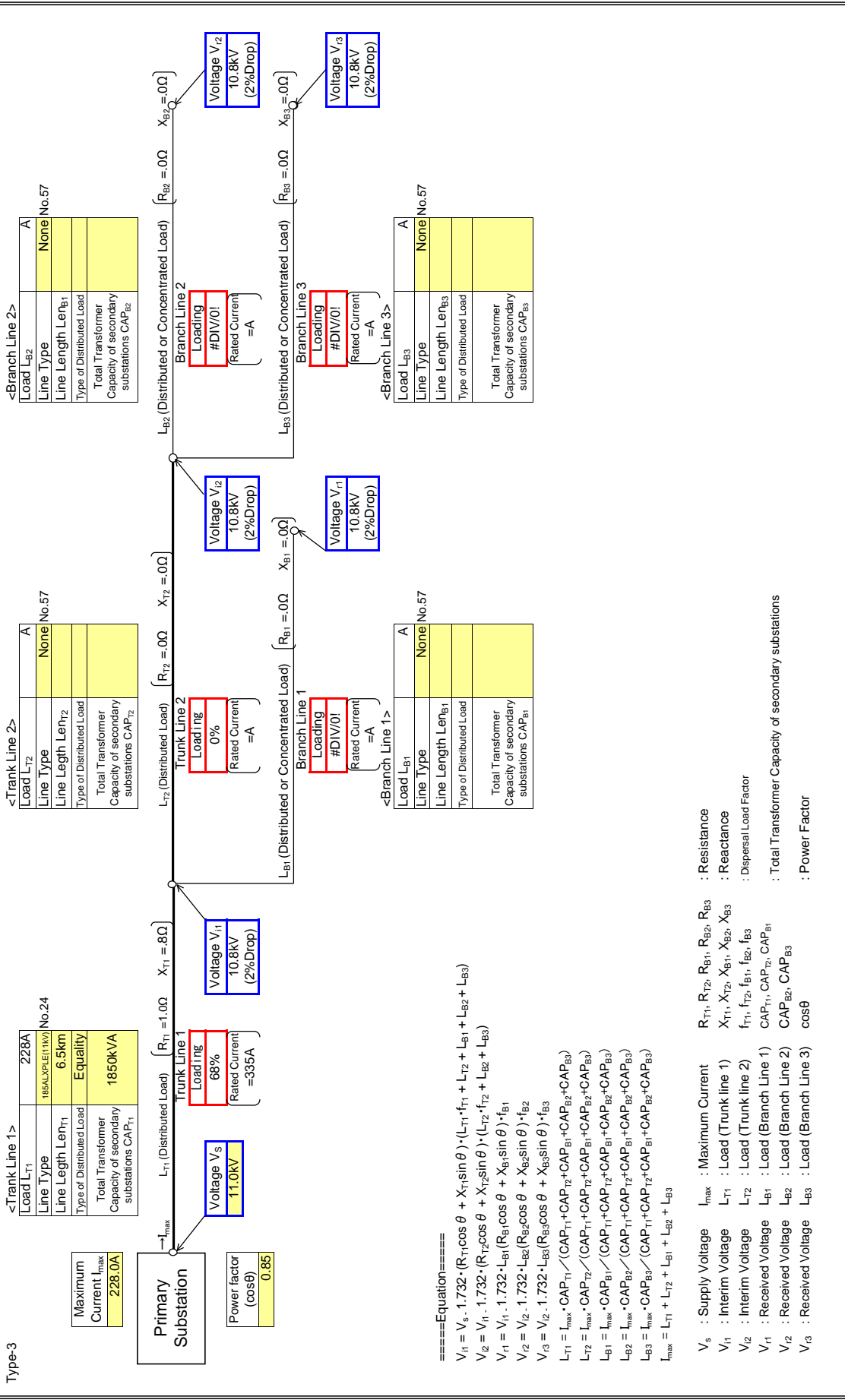
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

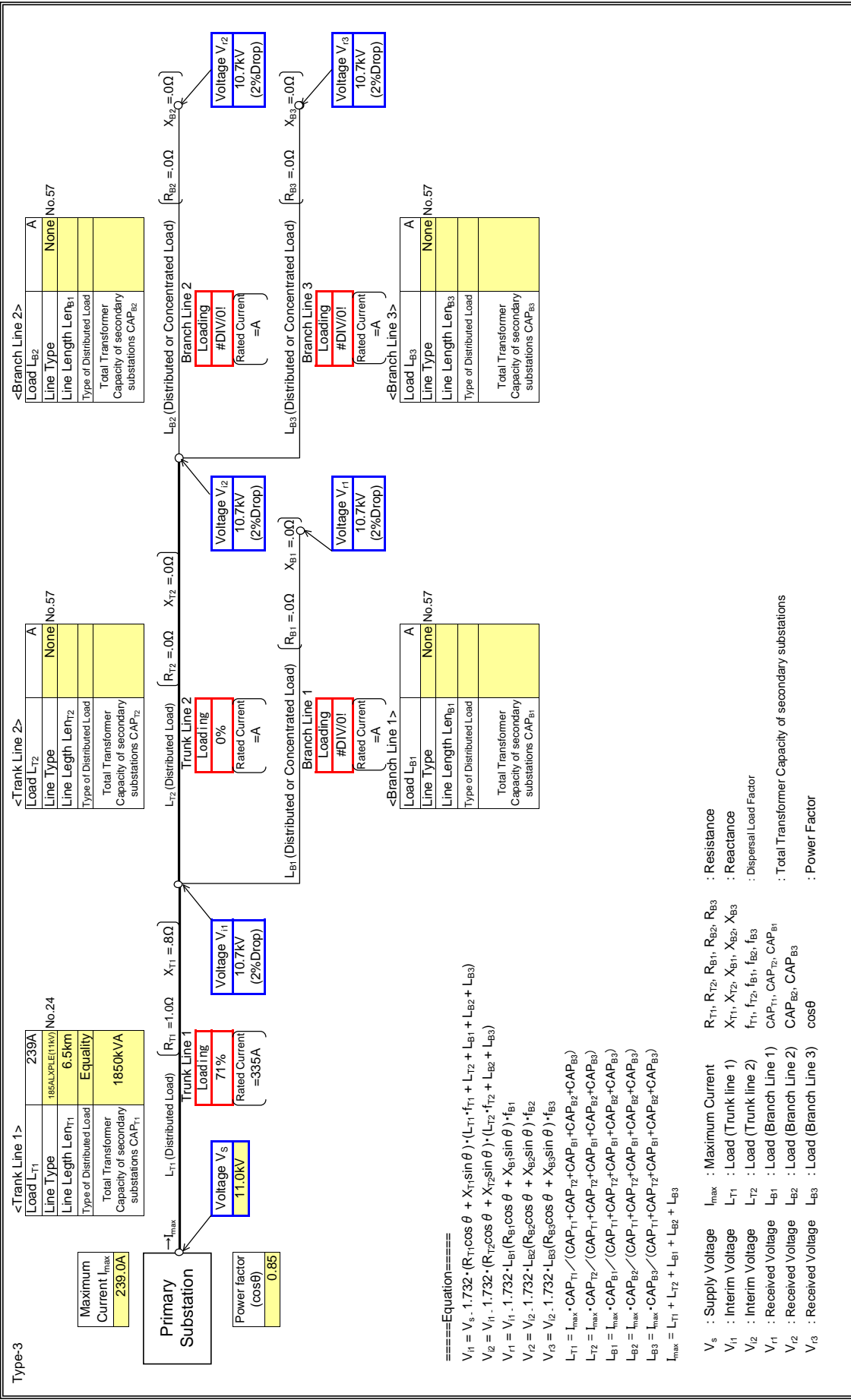
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

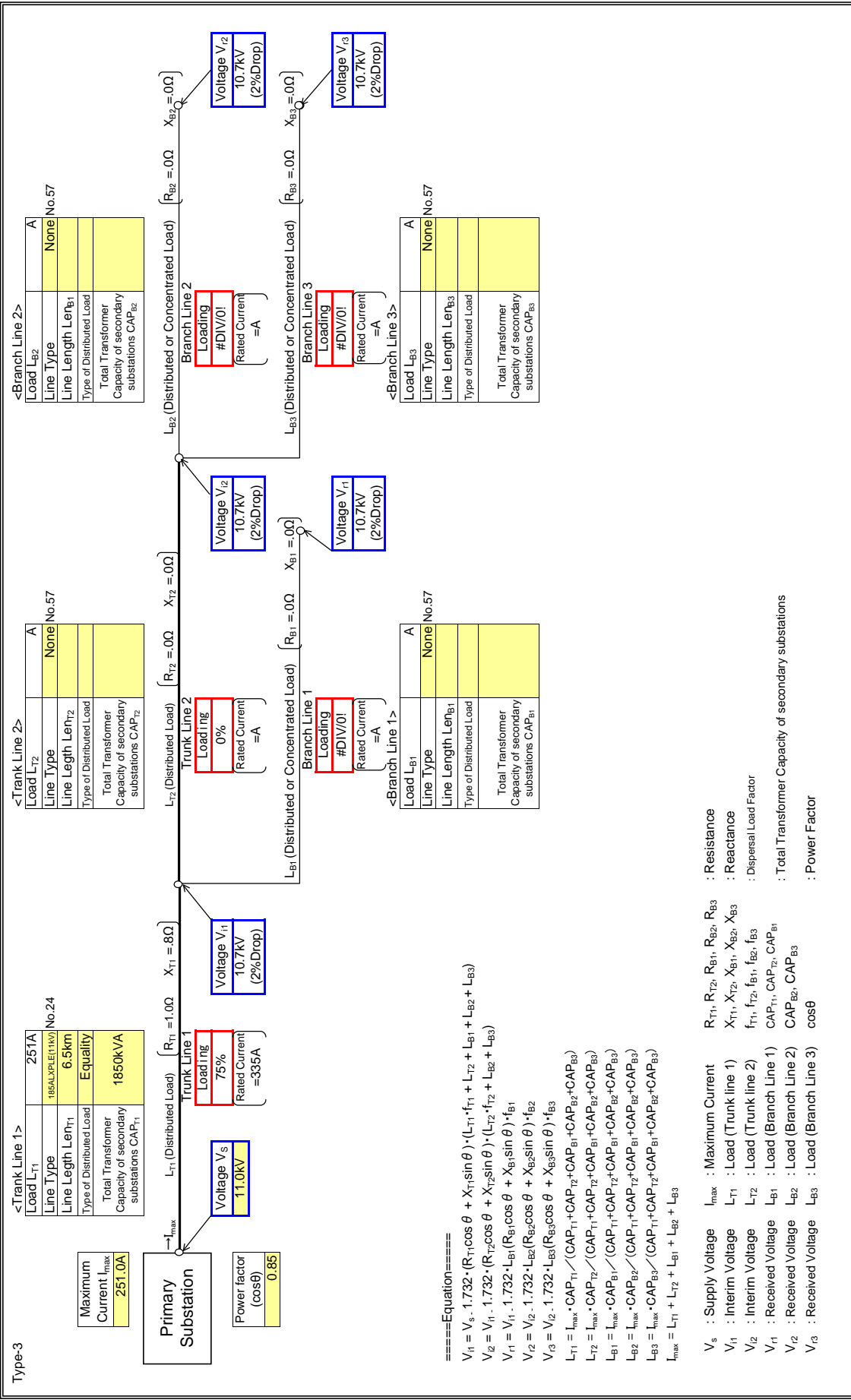
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

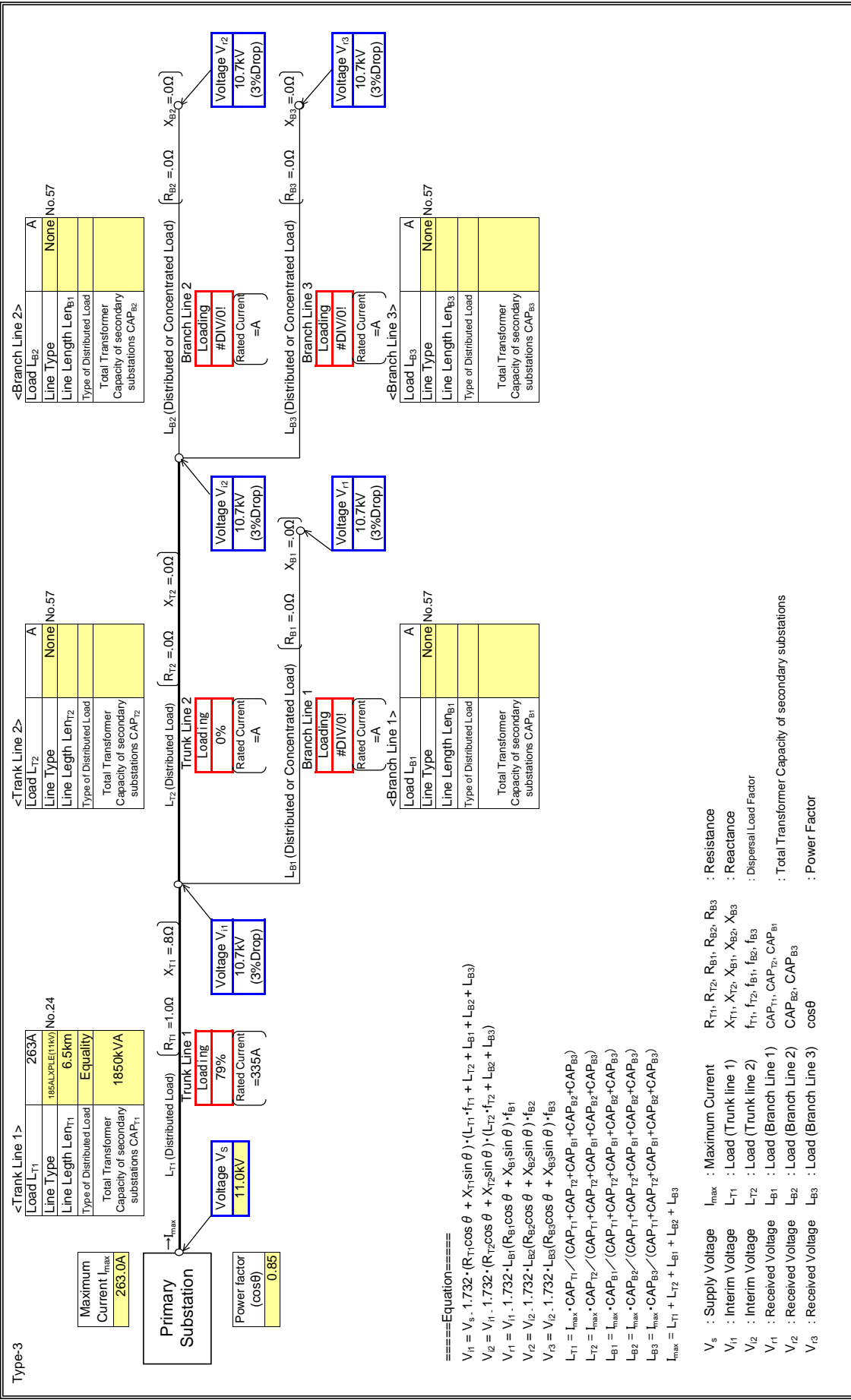
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

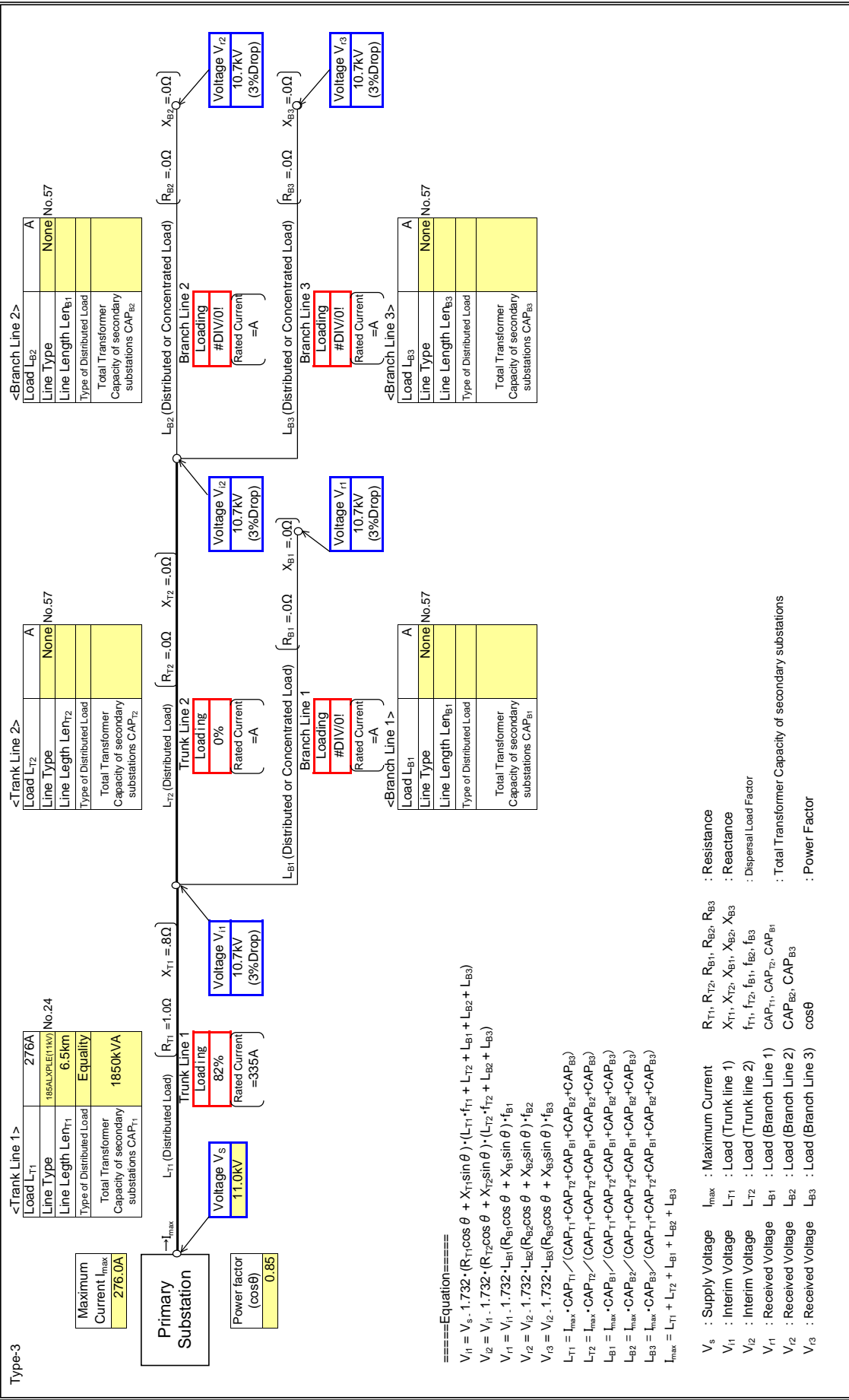
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

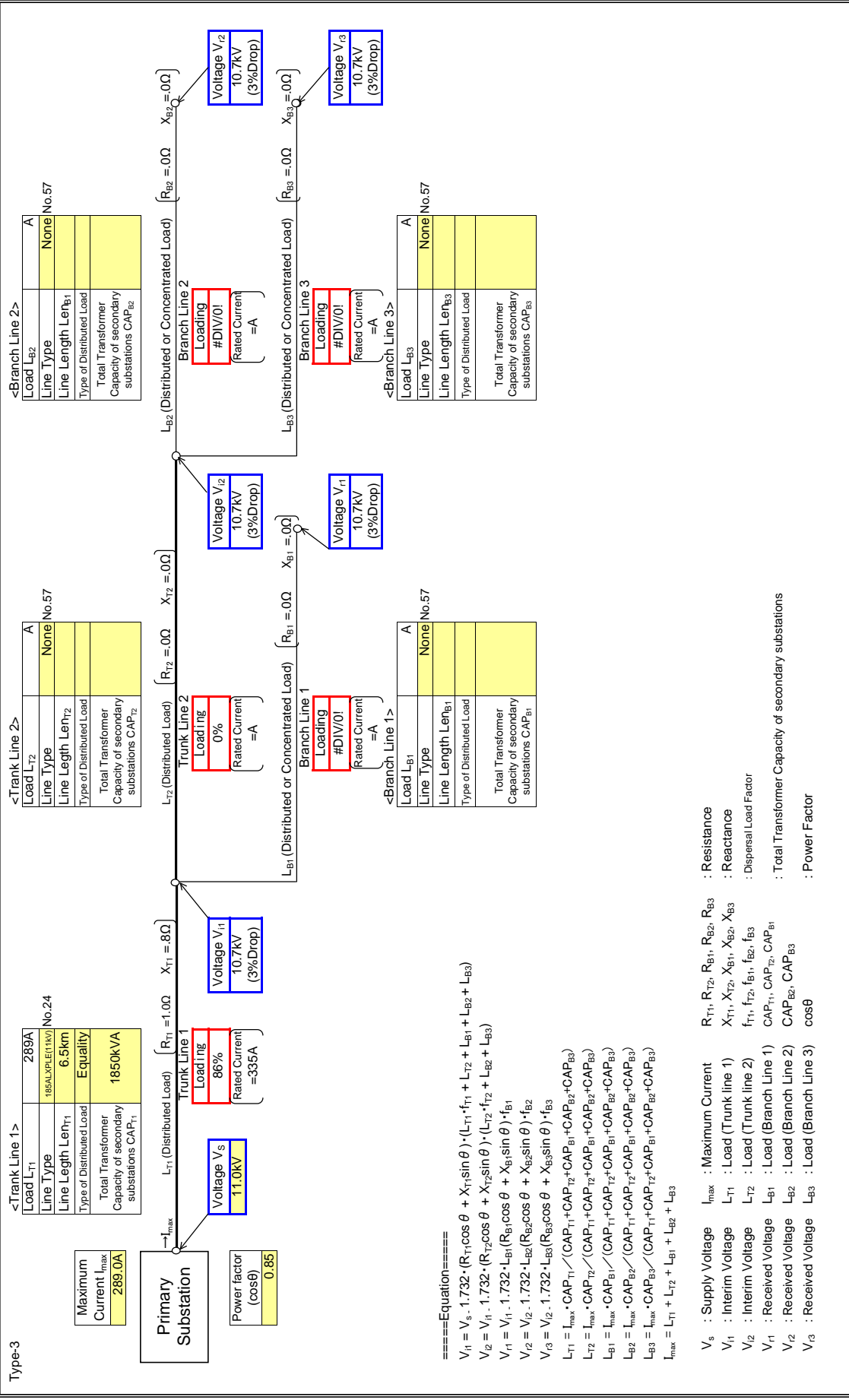
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION R
Feeder Name	R5

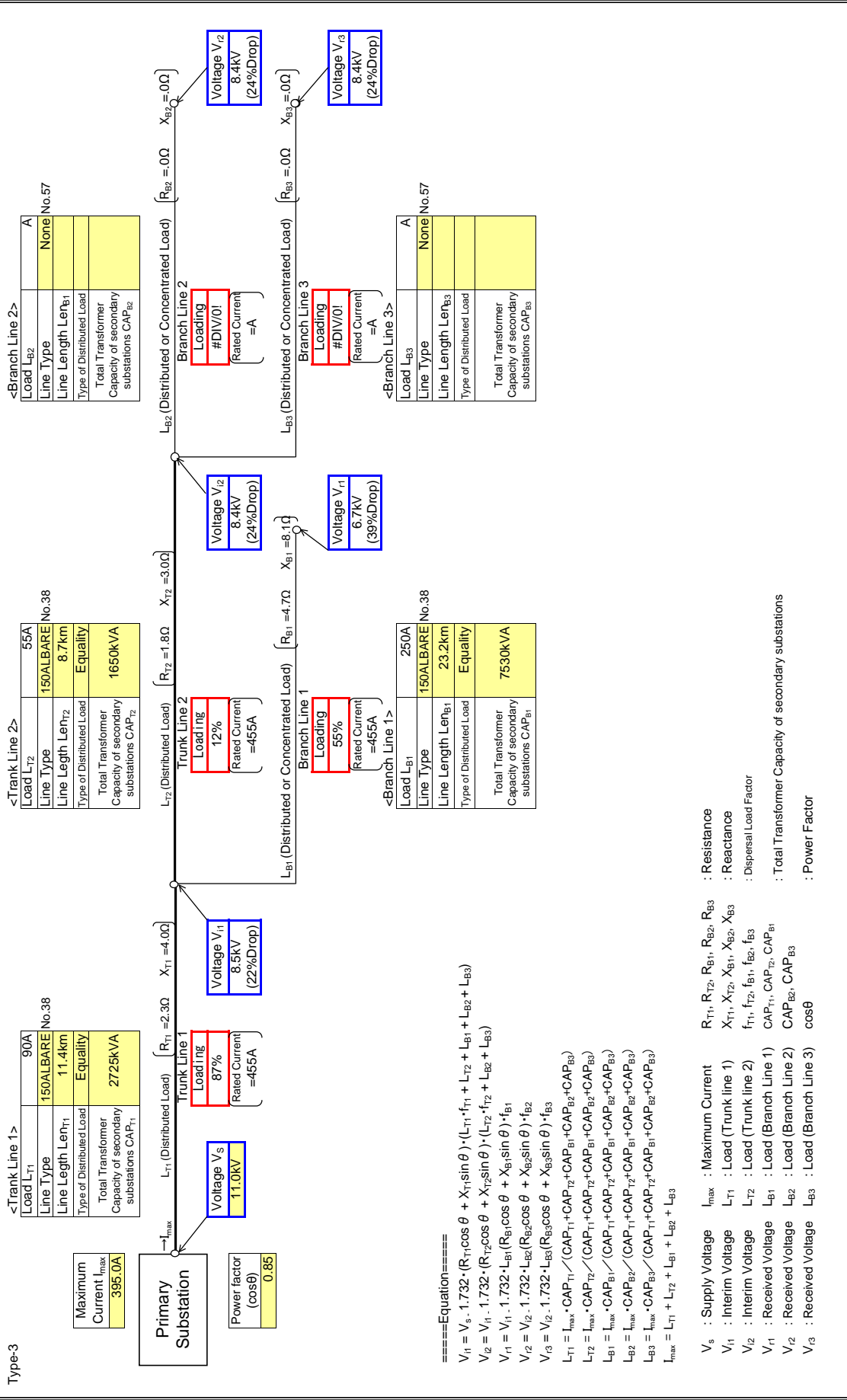
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

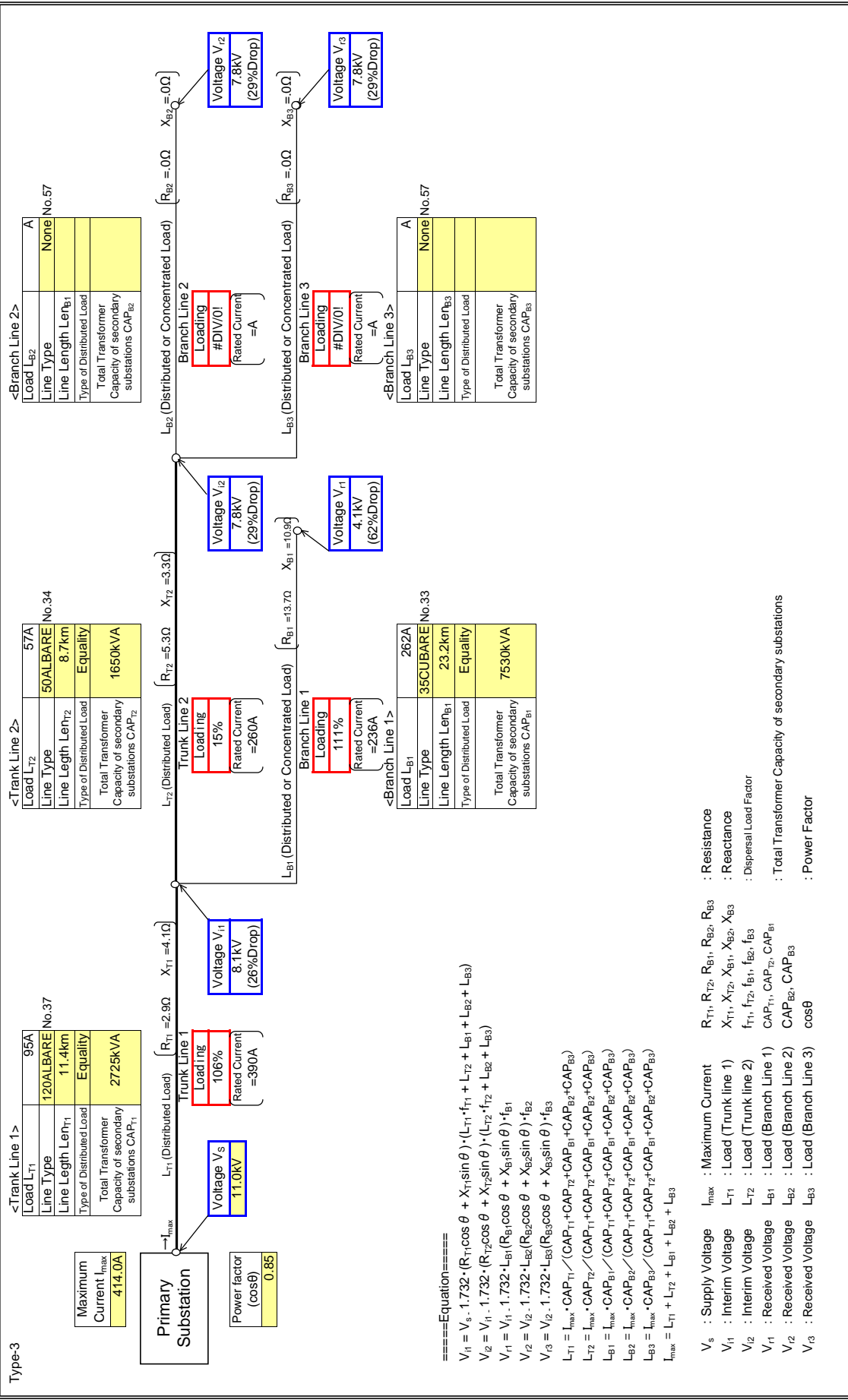
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

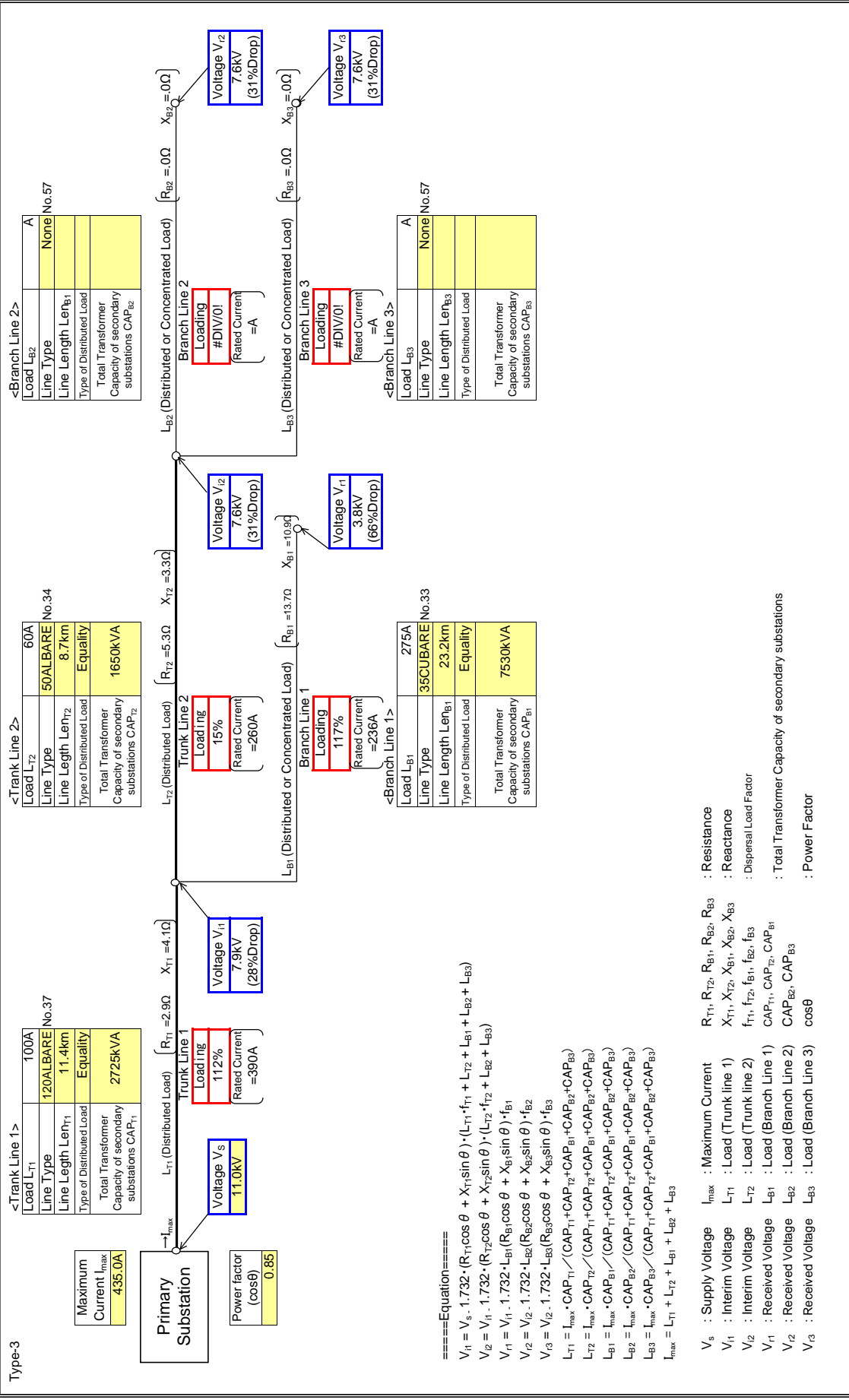
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r4} = V_{r3} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r5} = V_{r4} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

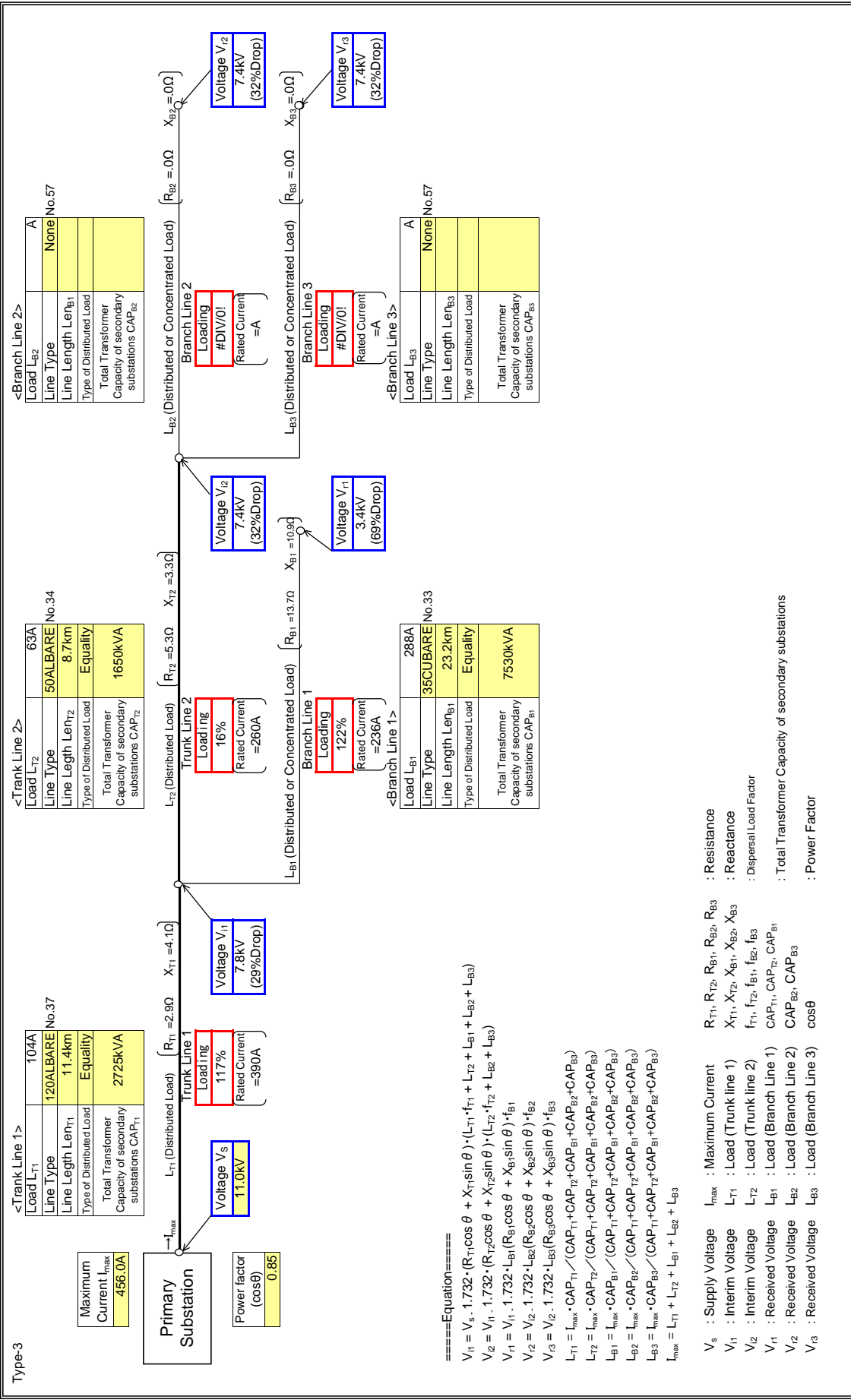
Legend:

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

Type-3 : Input data in colored cells



====Equation====

$$V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

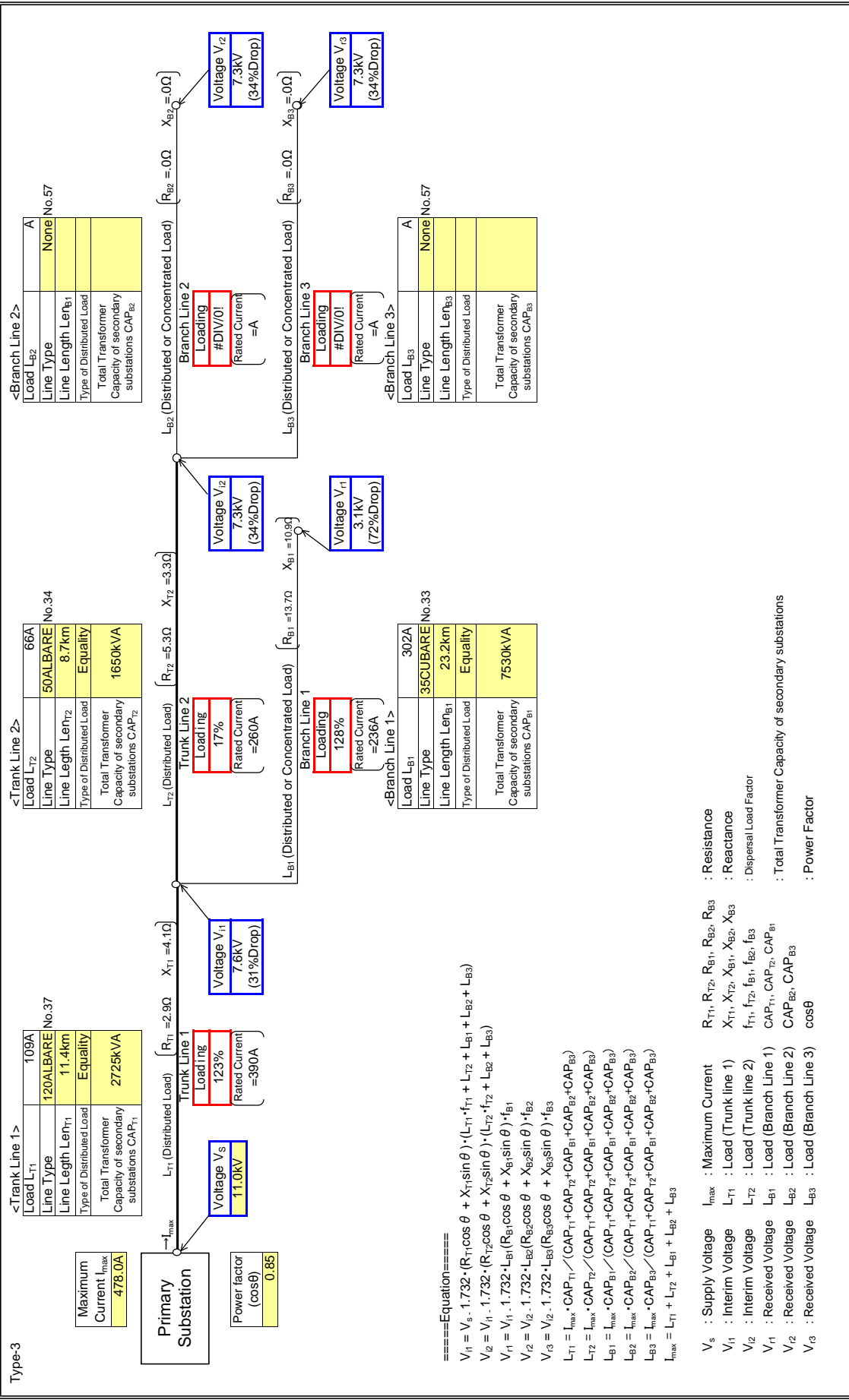
$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

V_s : Supply Voltage **I_{max} : Maximum Current** **R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3} : Resistance**
V_{r1} : Interim Voltage **L_{T1} : Load (Trunk line 1)** **X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3} : Reactance**
V_{r2} : Interim Voltage **L_{T2} : Load (Trunk line 2)** **f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3} : Dispersal Load Factor**
V_{r1} : Received Voltage **L_{B1} : Load (Branch Line 1)** **CAP_{T1}, CAP_{T2}, CAP_{B1} : Total Transformer Capacity of secondary substations**
V_{r2} : Received Voltage **L_{B2} : Load (Branch Line 2)** **CAP_{B2}, CAP_{B3} : Power Factor**
V_{r3} : Received Voltage **L_{B3} : Load (Branch Line 3)** **cos θ**

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

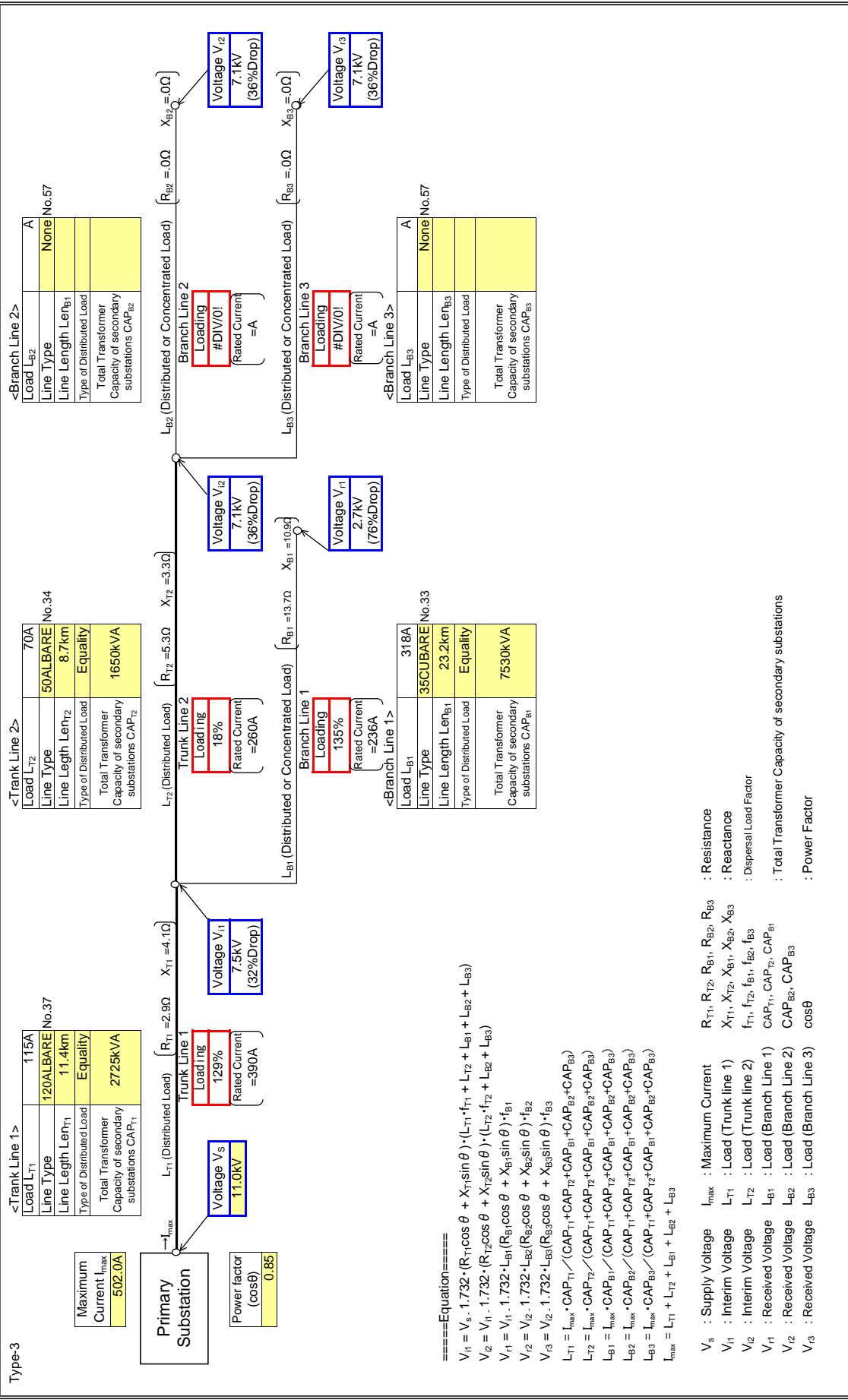
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

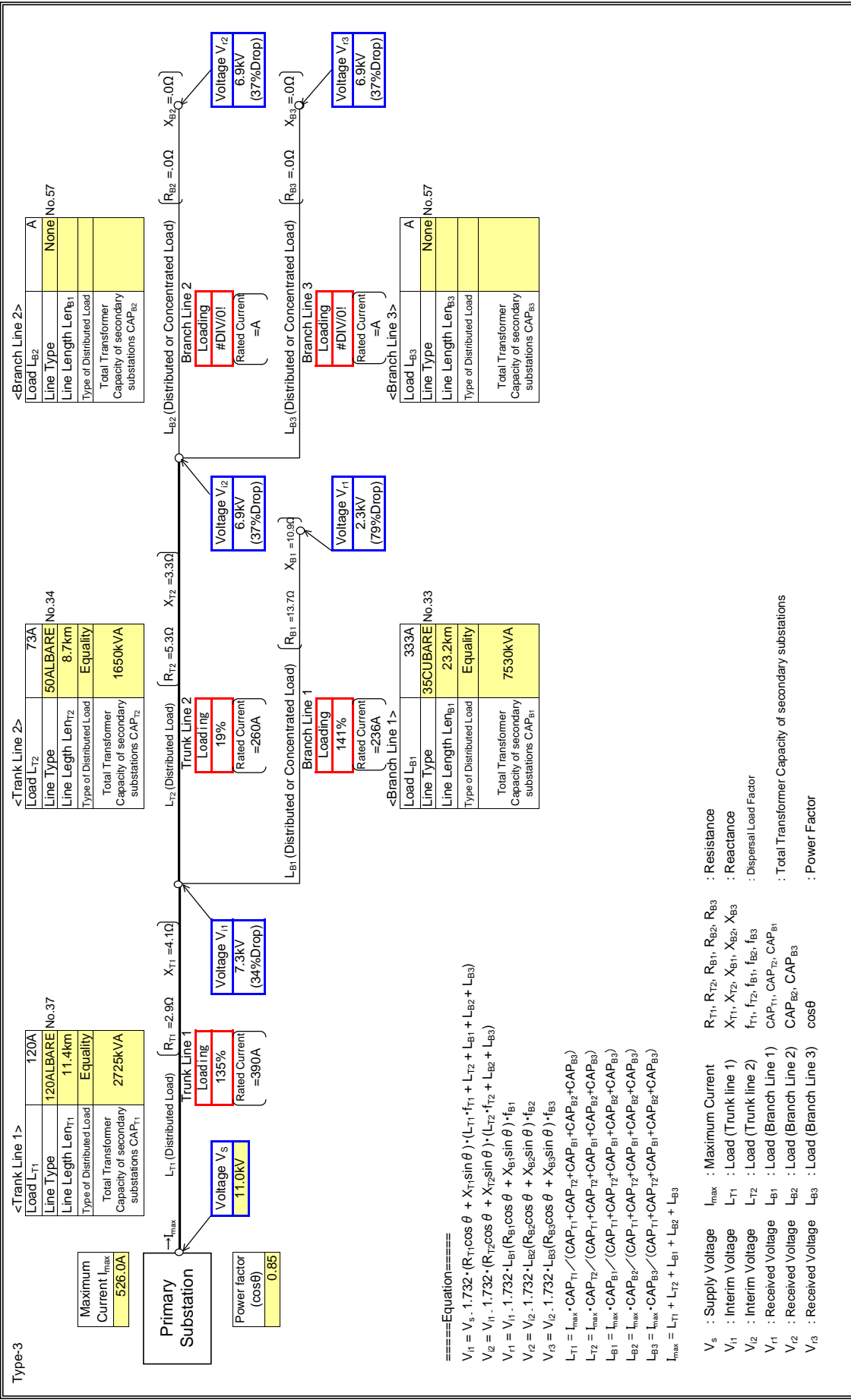
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

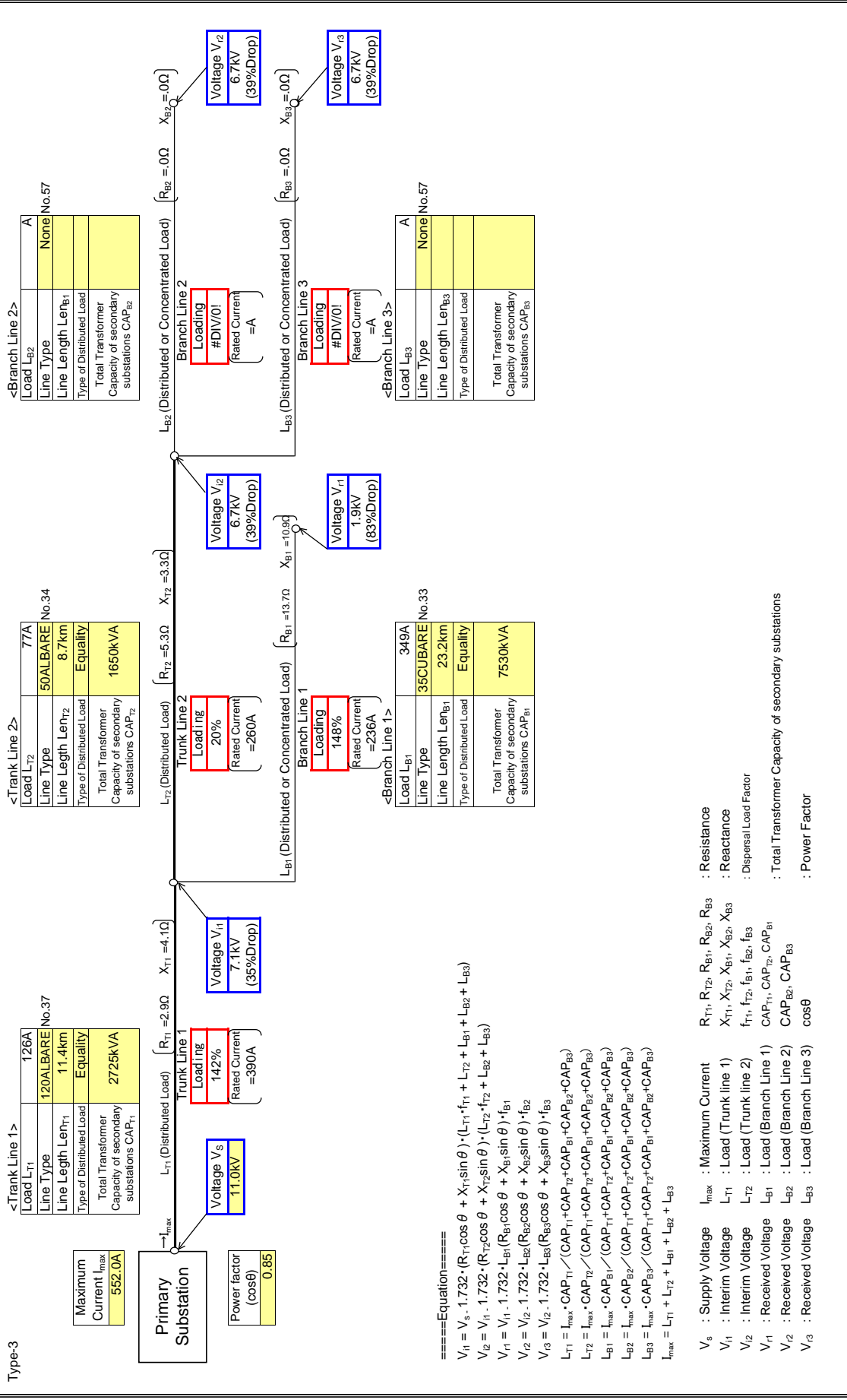
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

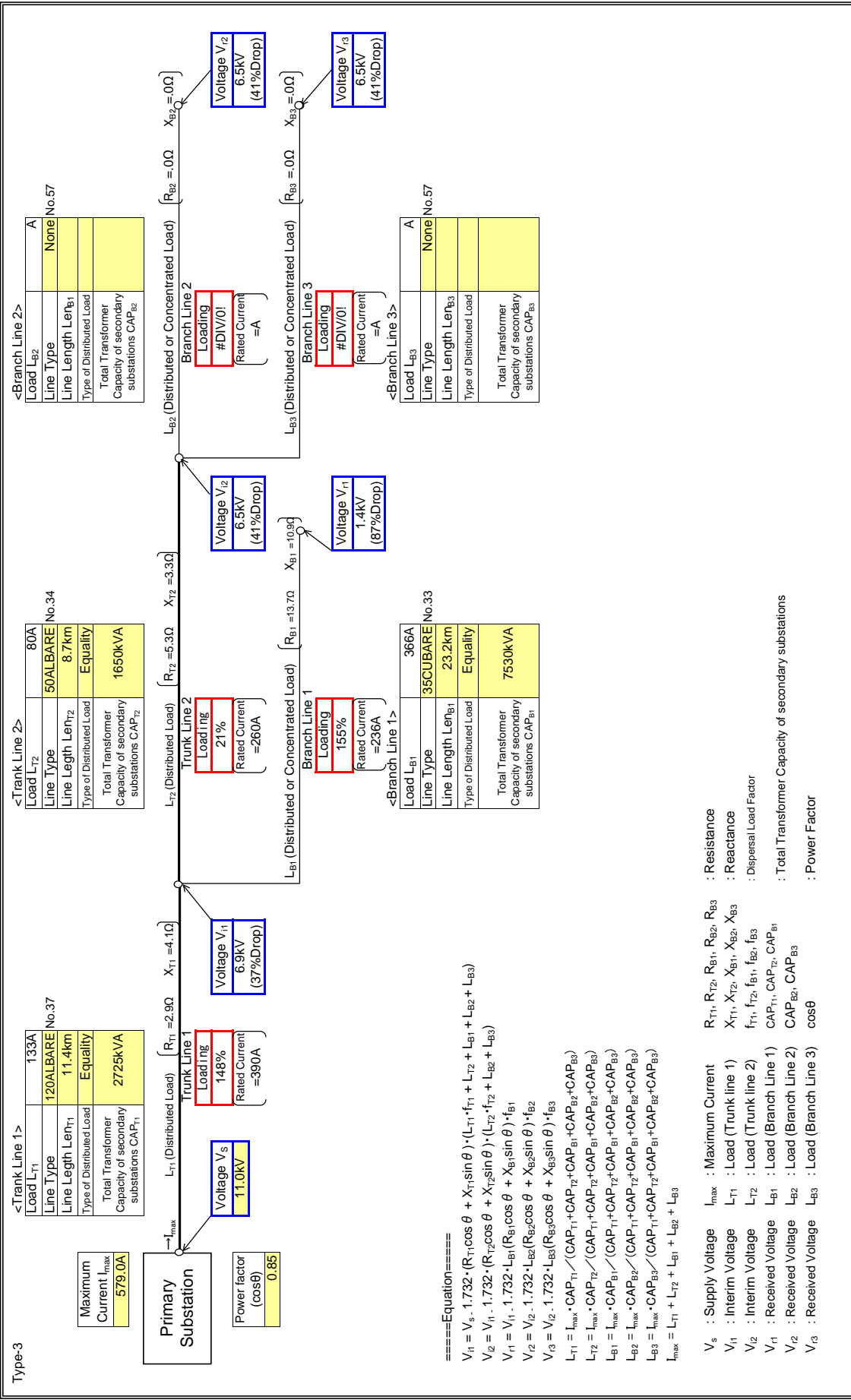
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

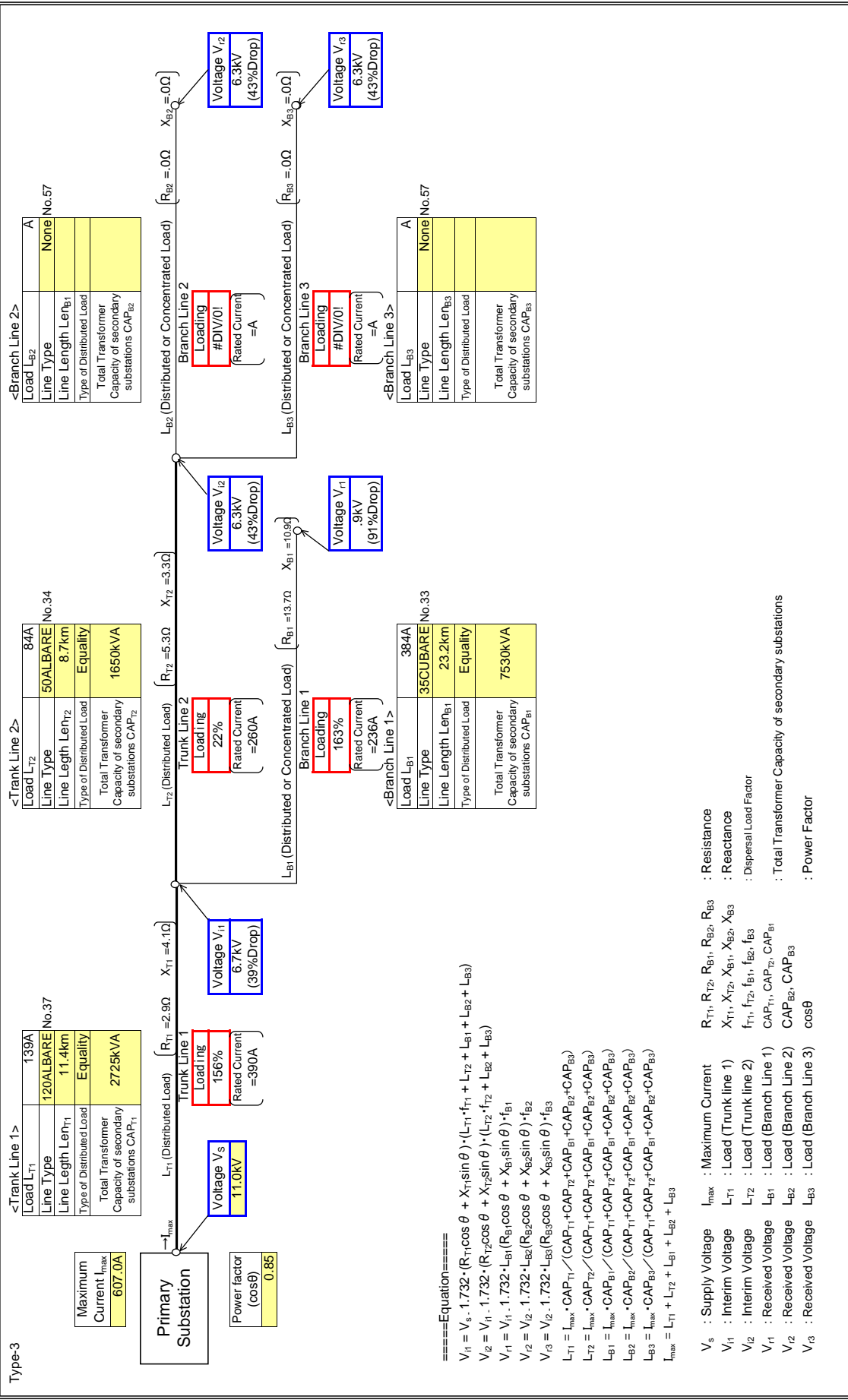
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

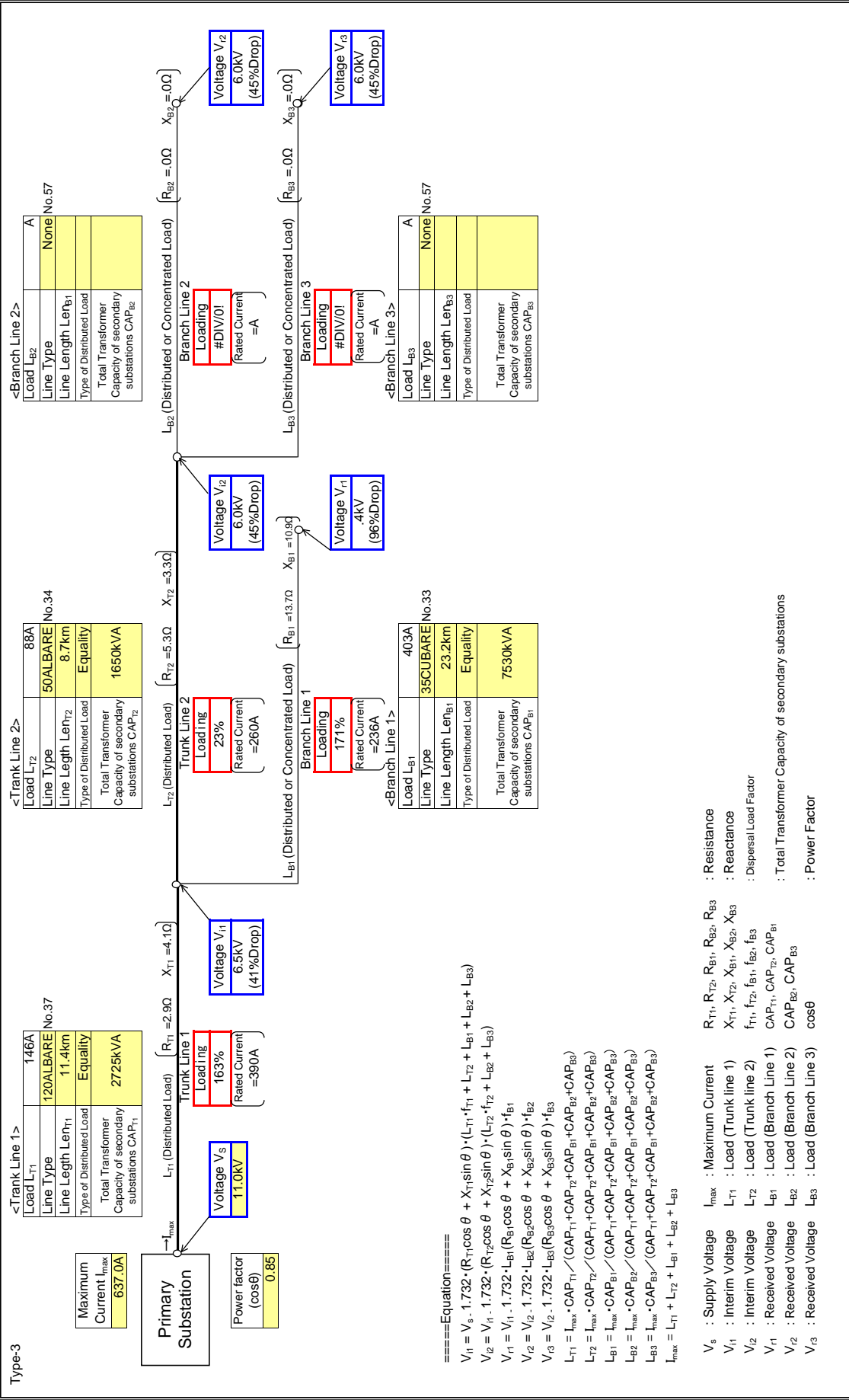
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

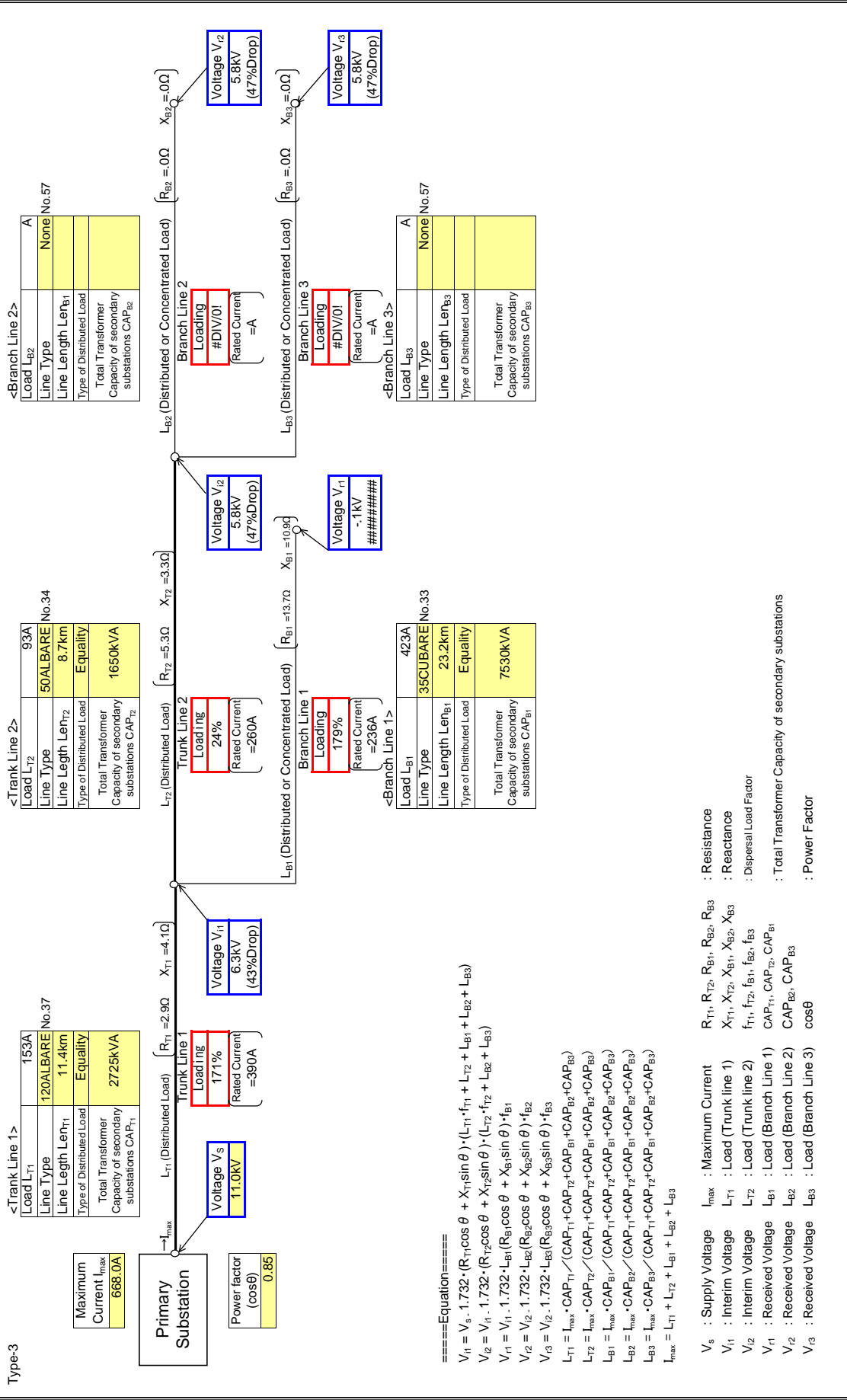
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	RADIO

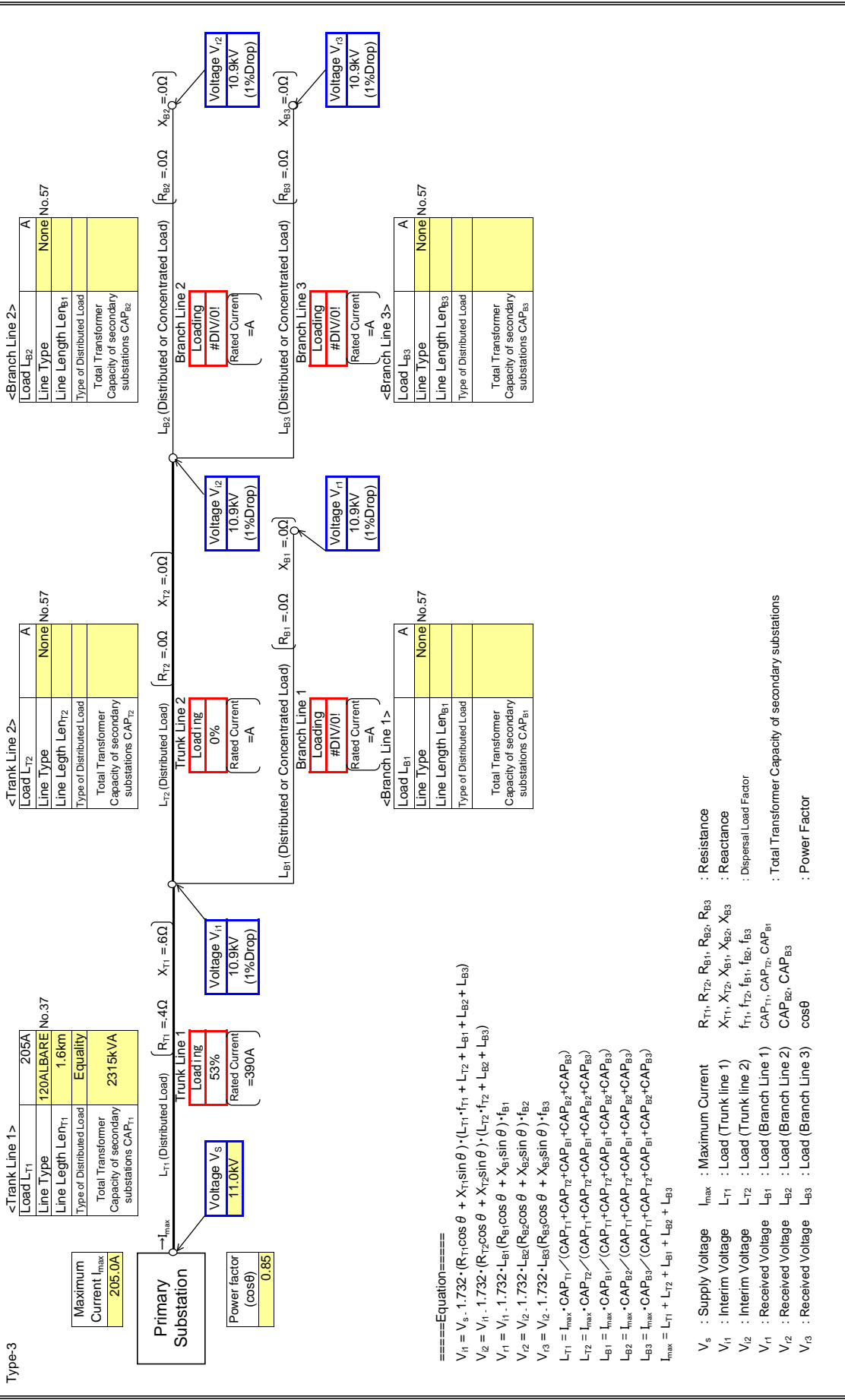
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

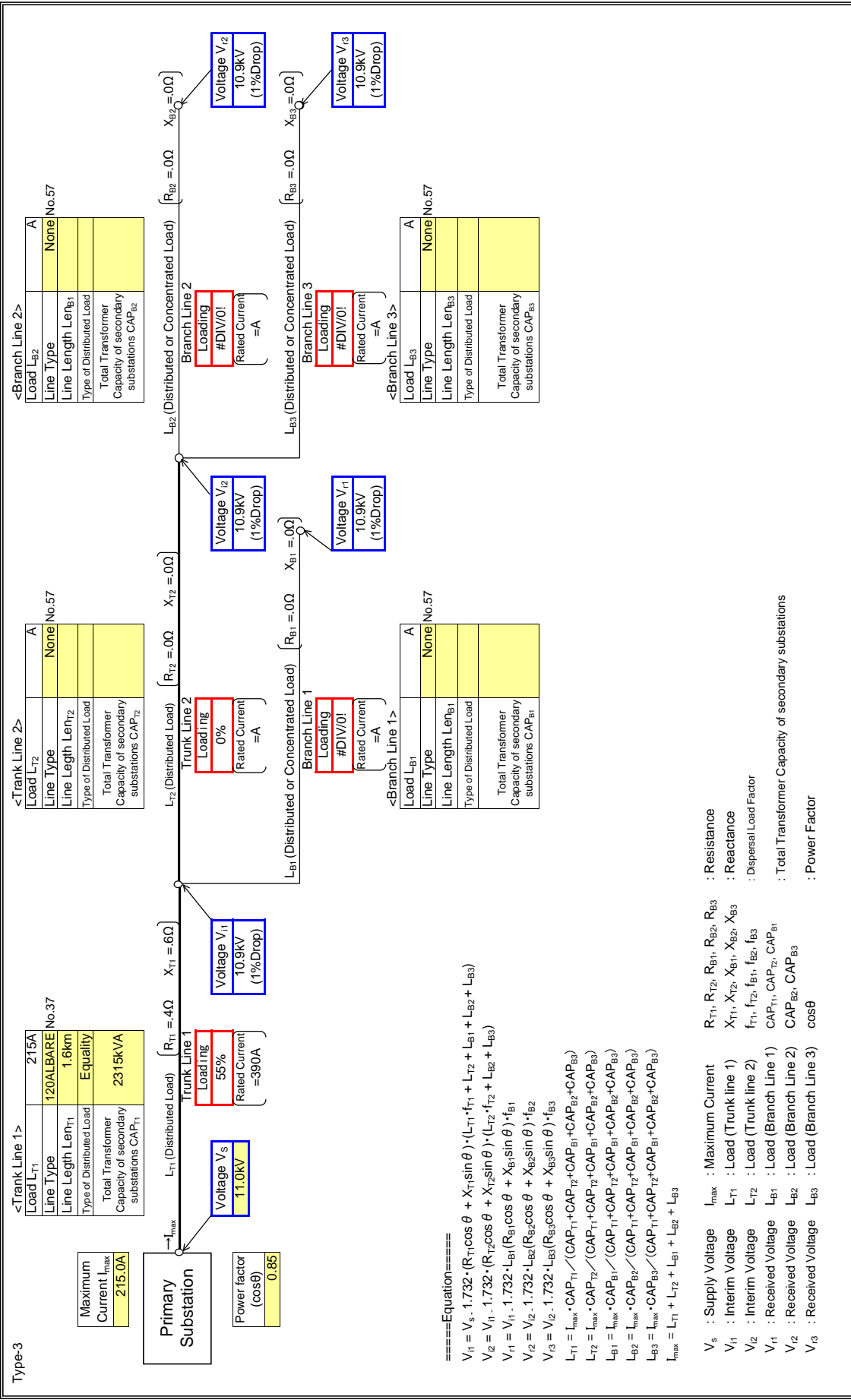
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

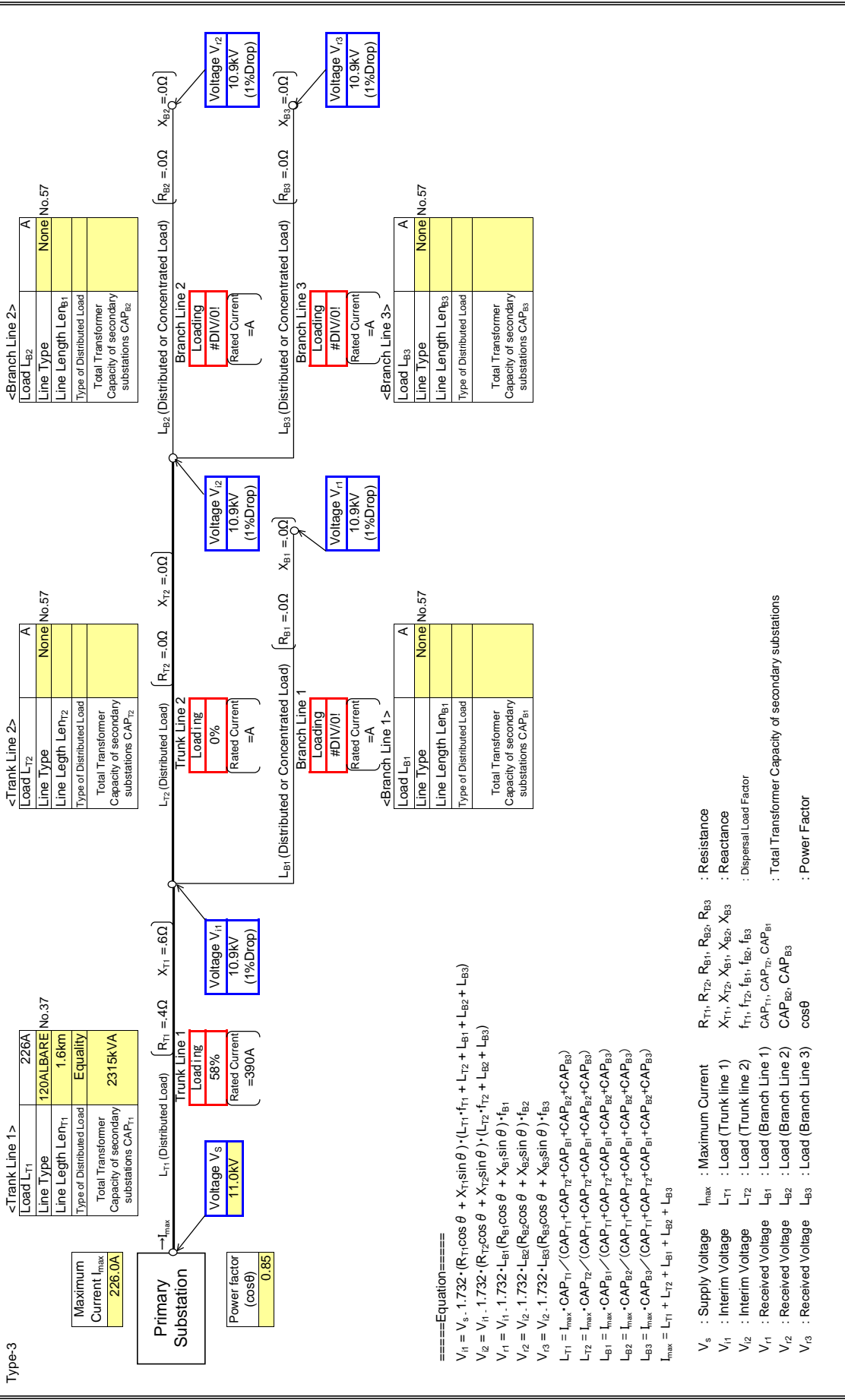
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

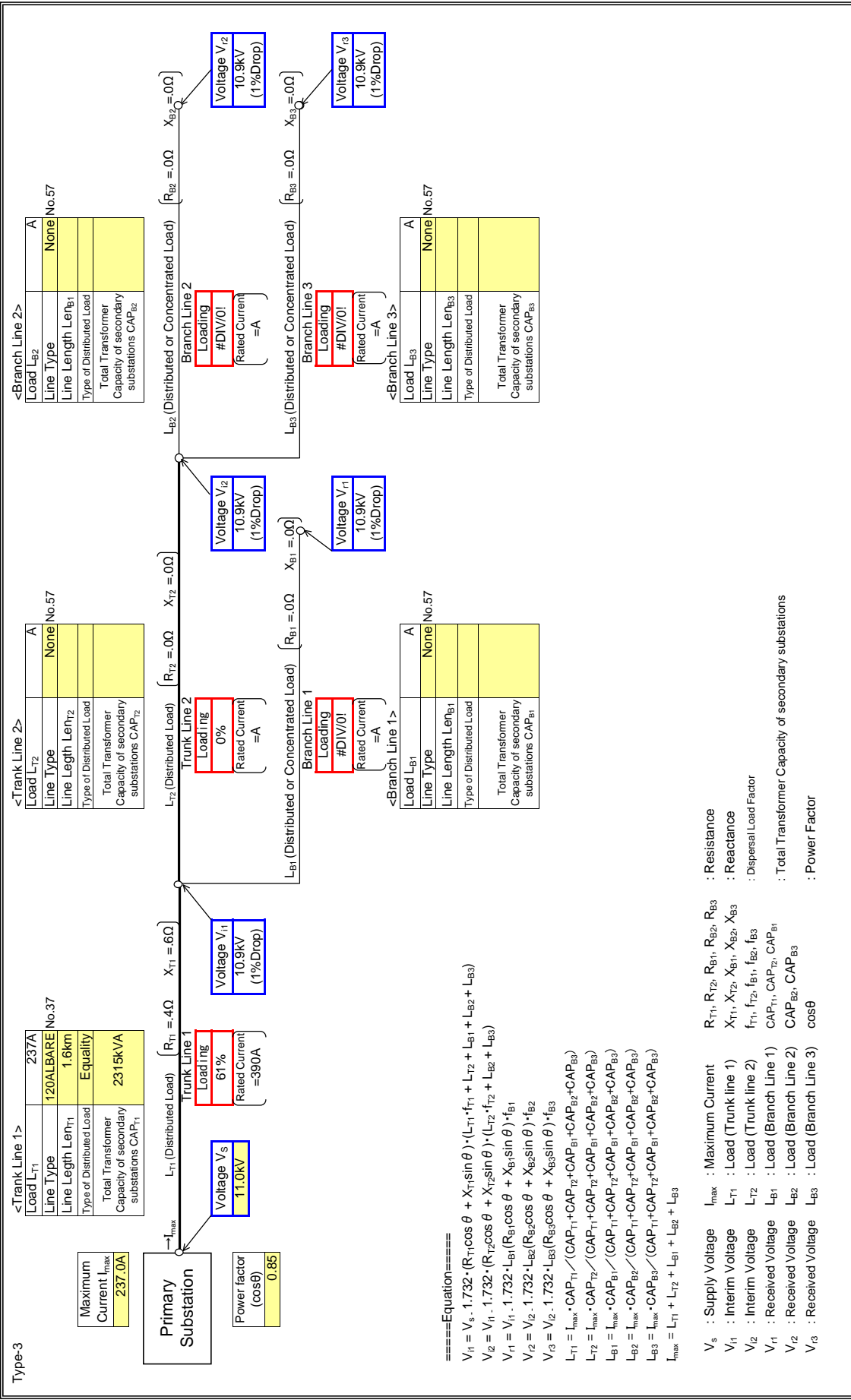
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

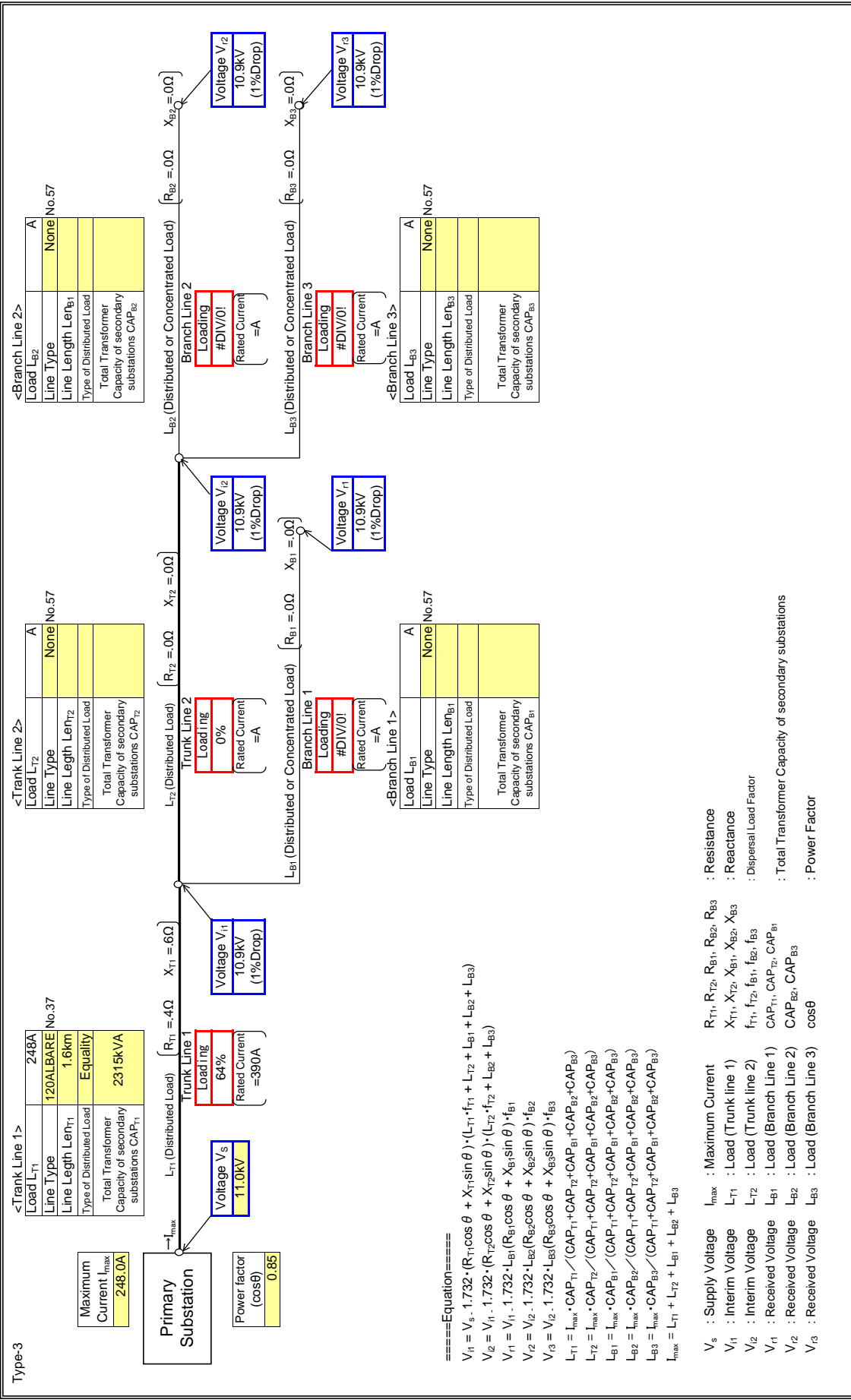
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

Type-3 : Input data in colored cells



====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{r2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{i3} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

V_s : Supply Voltage I_{max} : Maximum Current R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3} : Resistance

V_{i1} : Interim Voltage L_{T1} : Load (Trunk line 1) X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3} : Reactance

V_{i2} : Interim Voltage L_{T2} : Load (Trunk line 2) f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3} : Dispersal Load Factor

V_{r1} : Received Voltage L_{B1} : Load (Branch Line 1) CAP_{T1}, CAP_{T2}, CAP_{B1} : Total Transformer Capacity of secondary substations

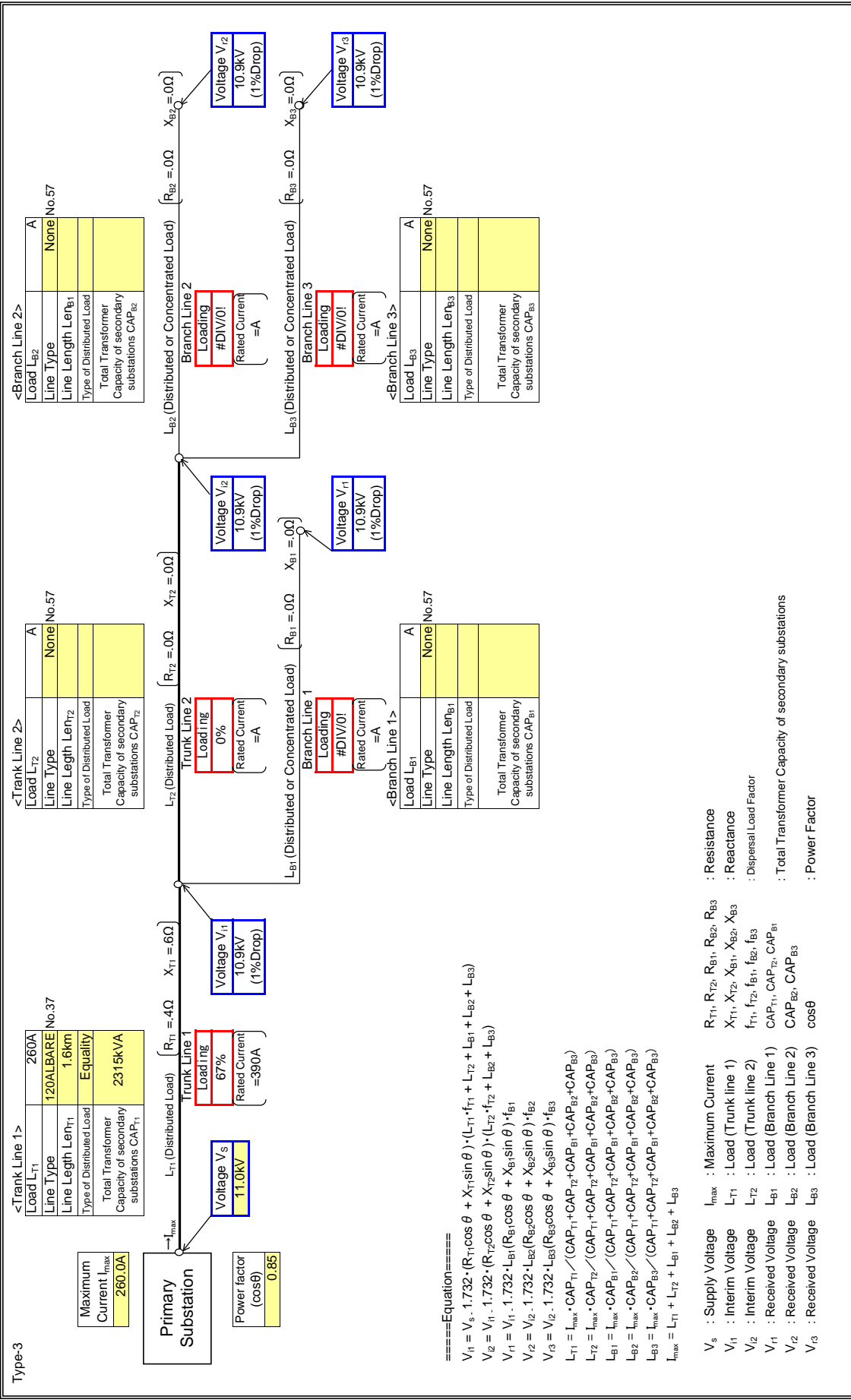
V_{r2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor

V_{r3} : Received Voltage L_{B3} : Load (Branch Line 3) cosθ

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

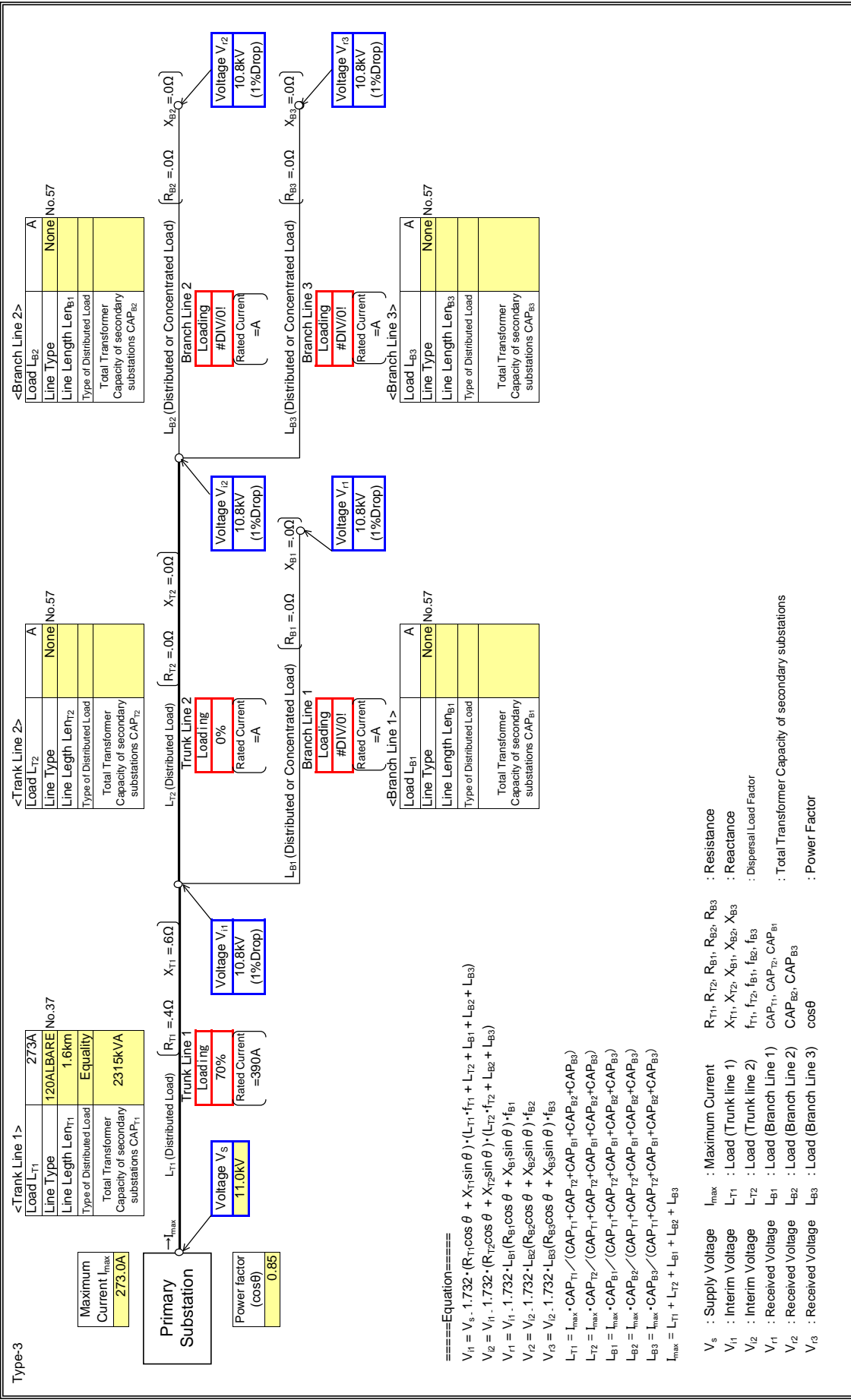
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

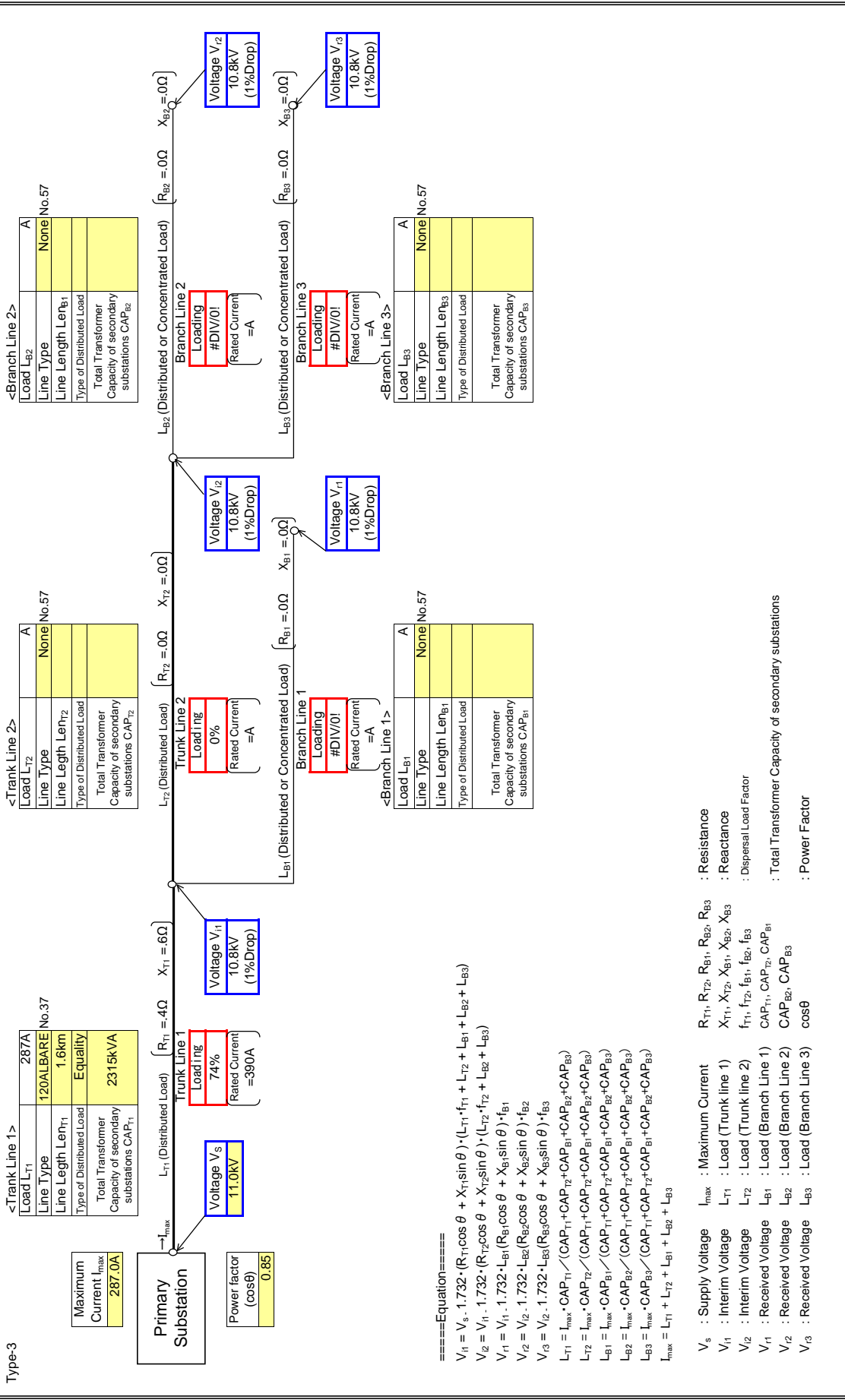
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

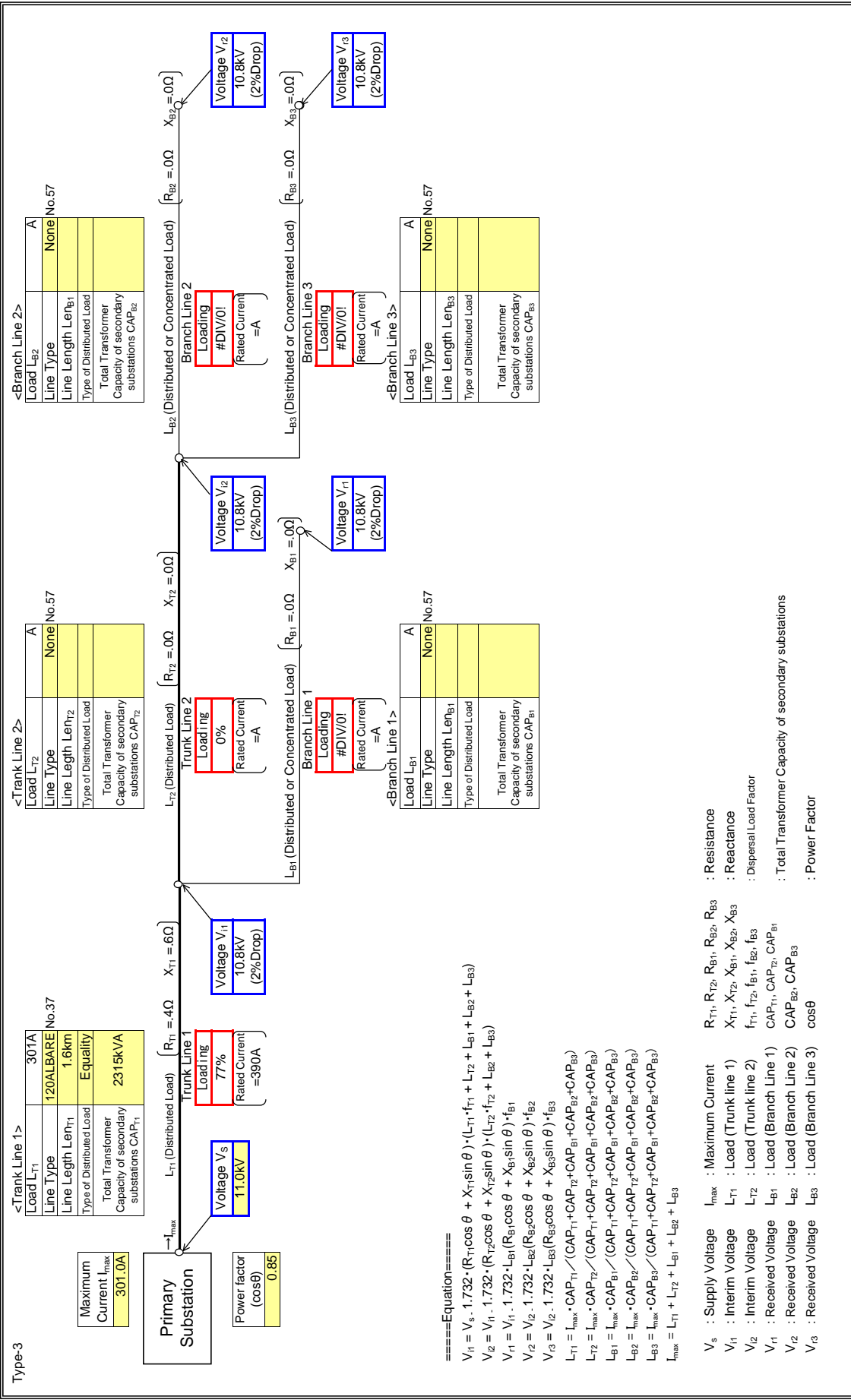
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

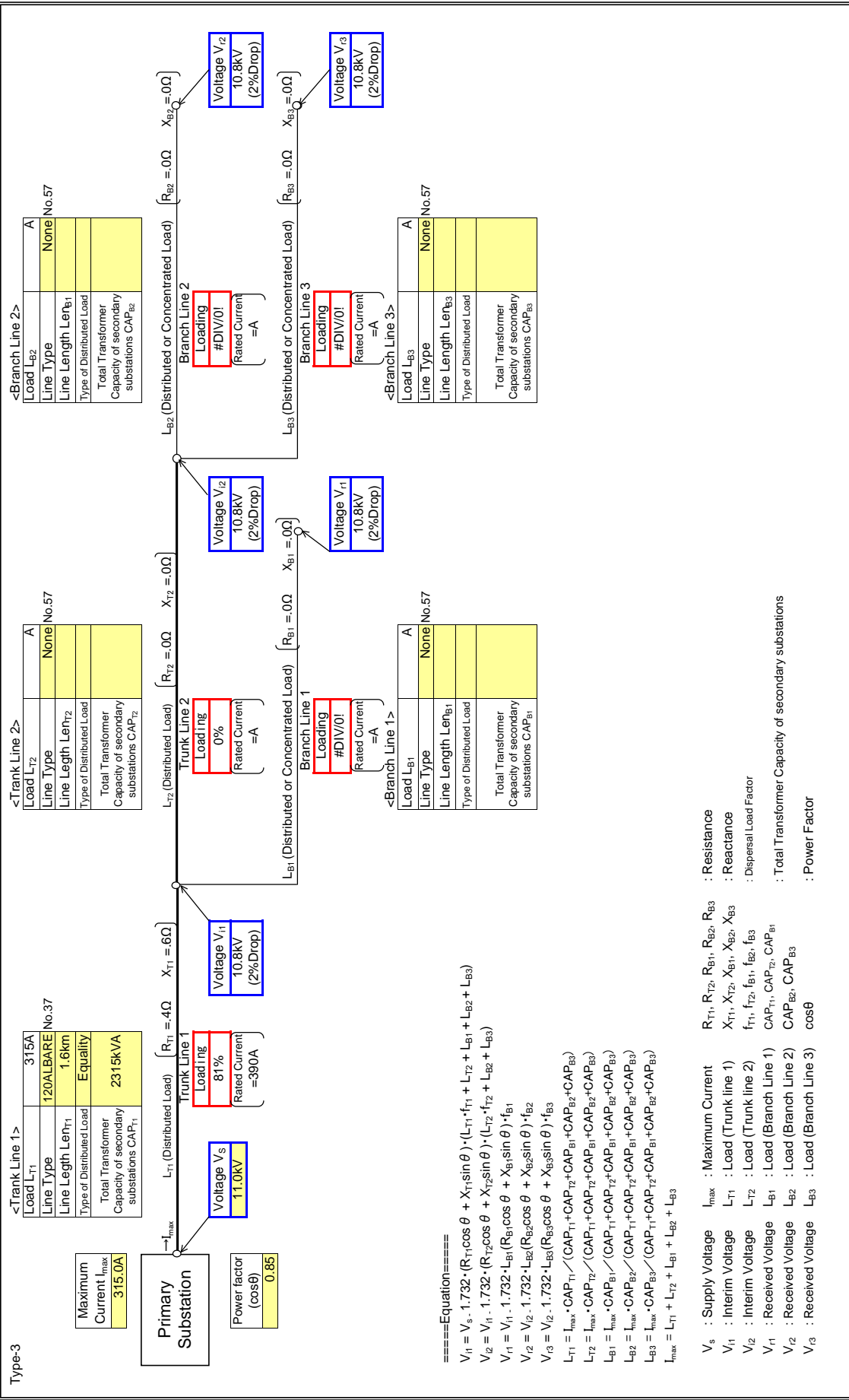
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

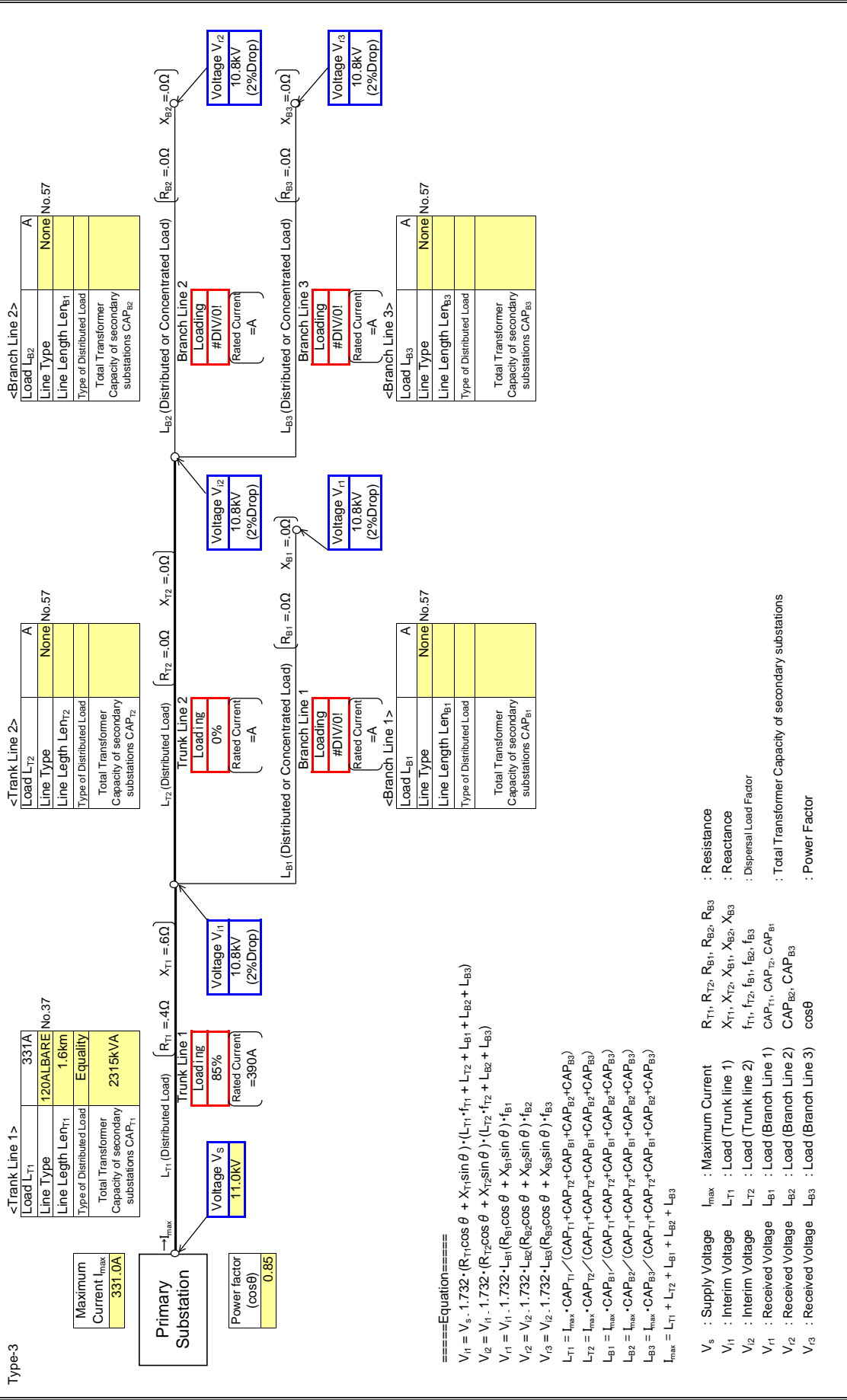
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

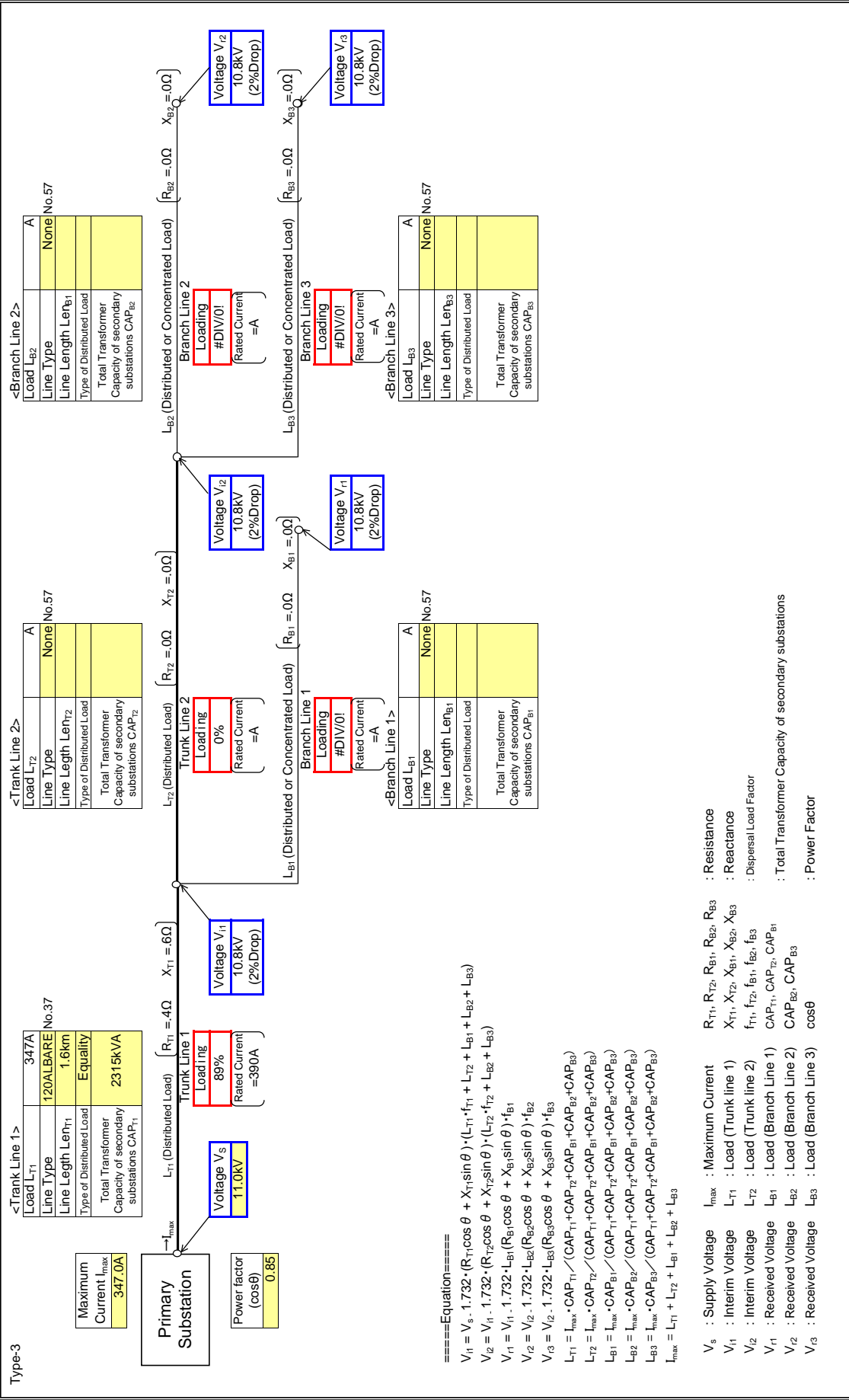
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S02

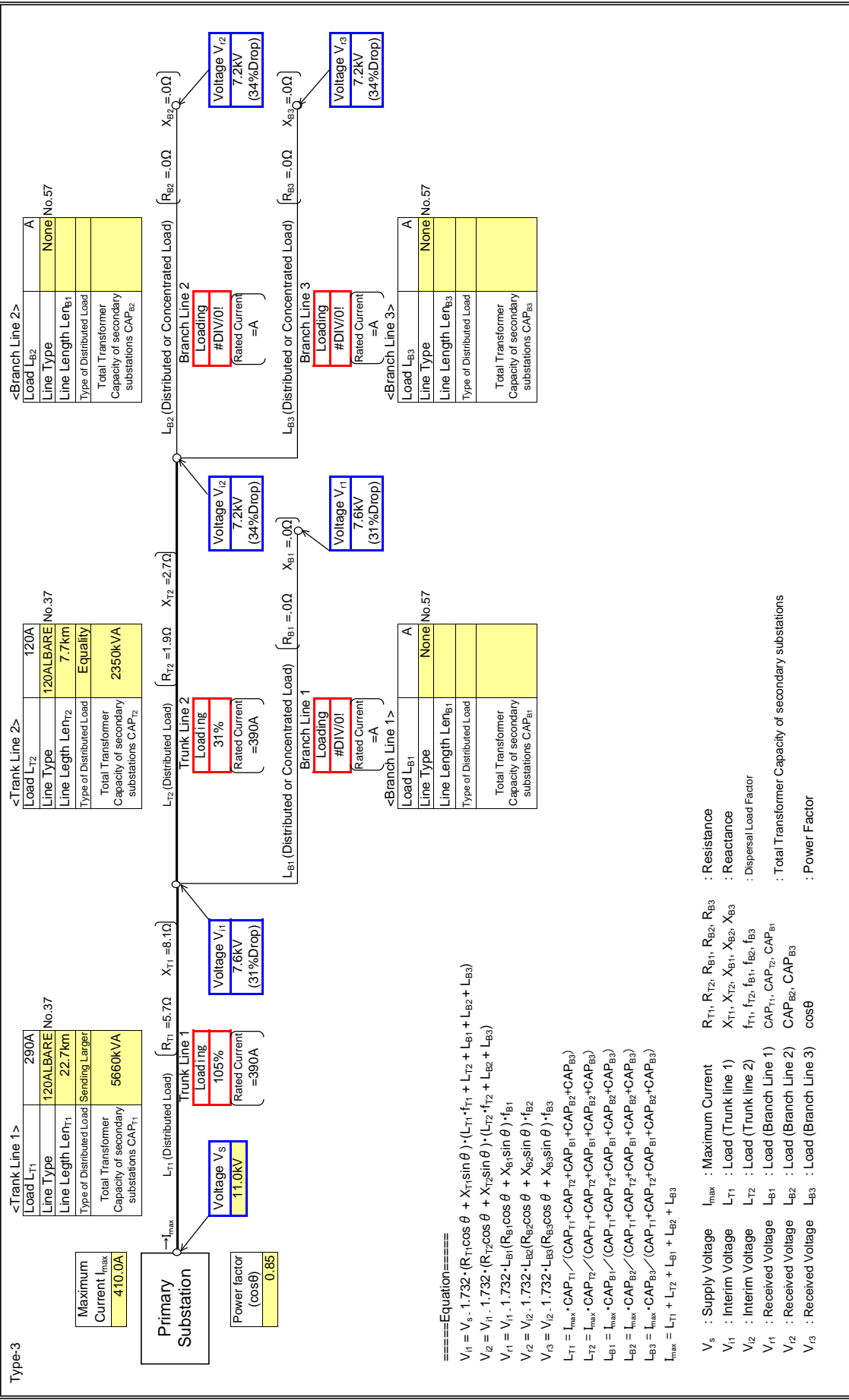
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

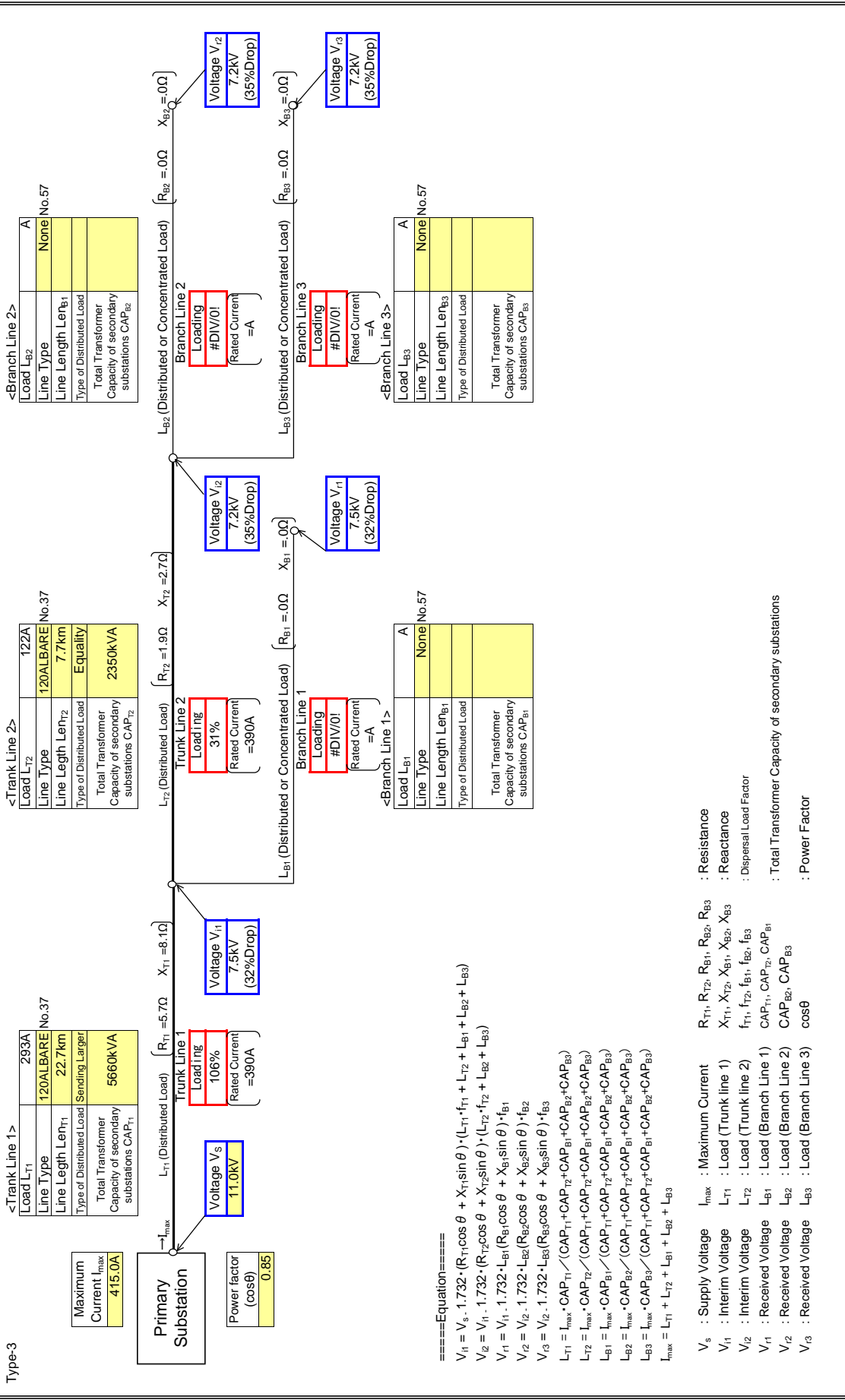
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

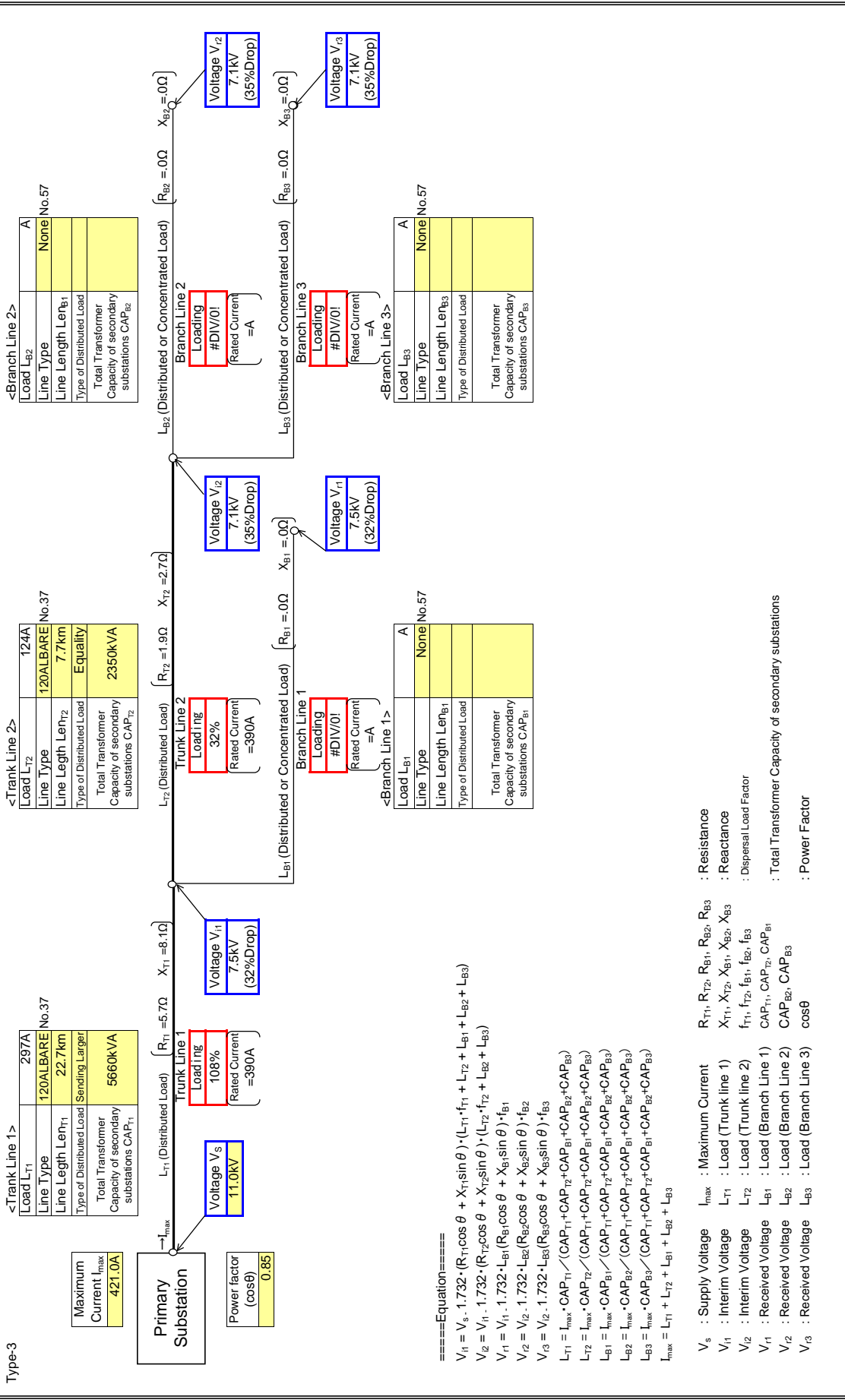
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

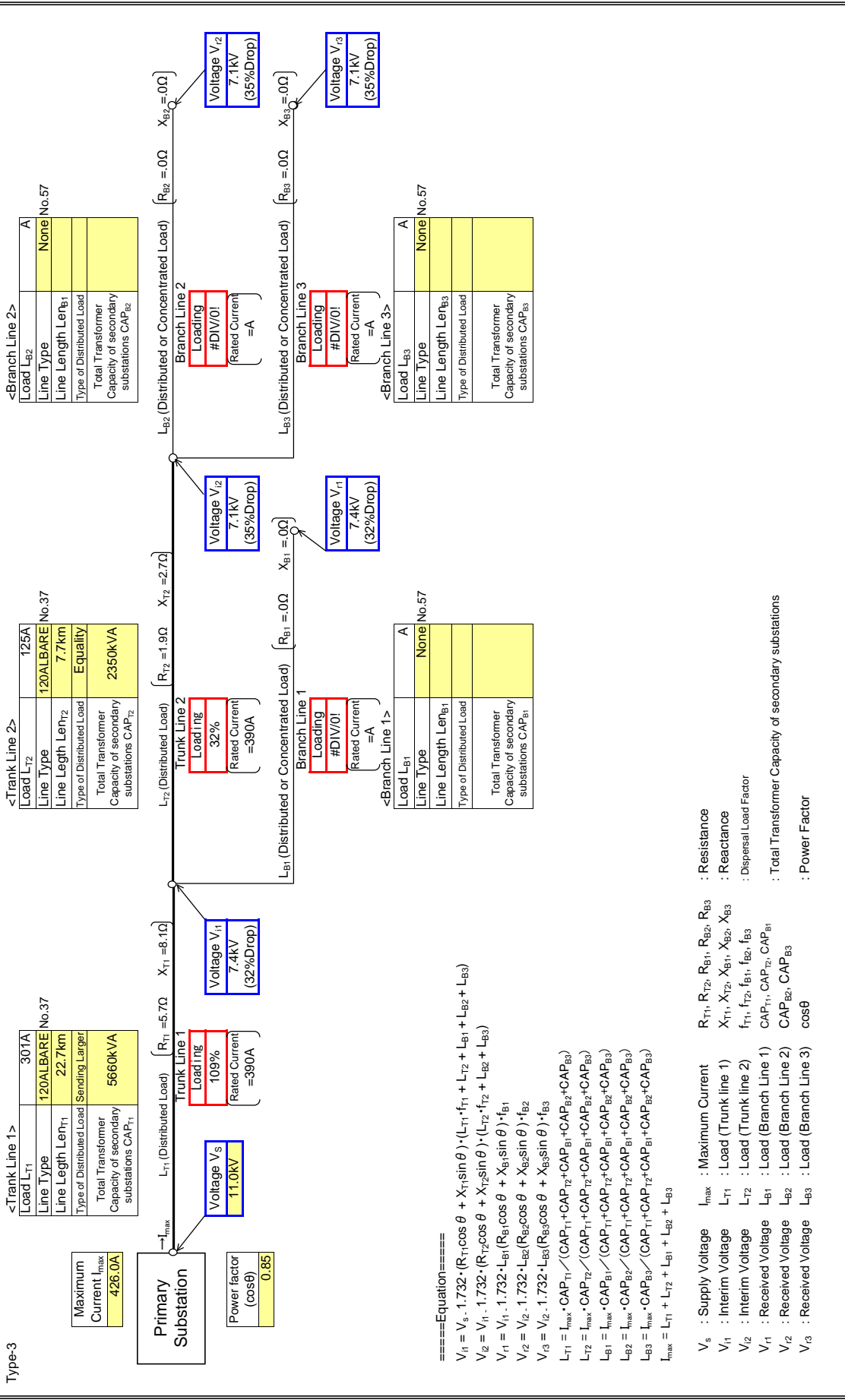
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

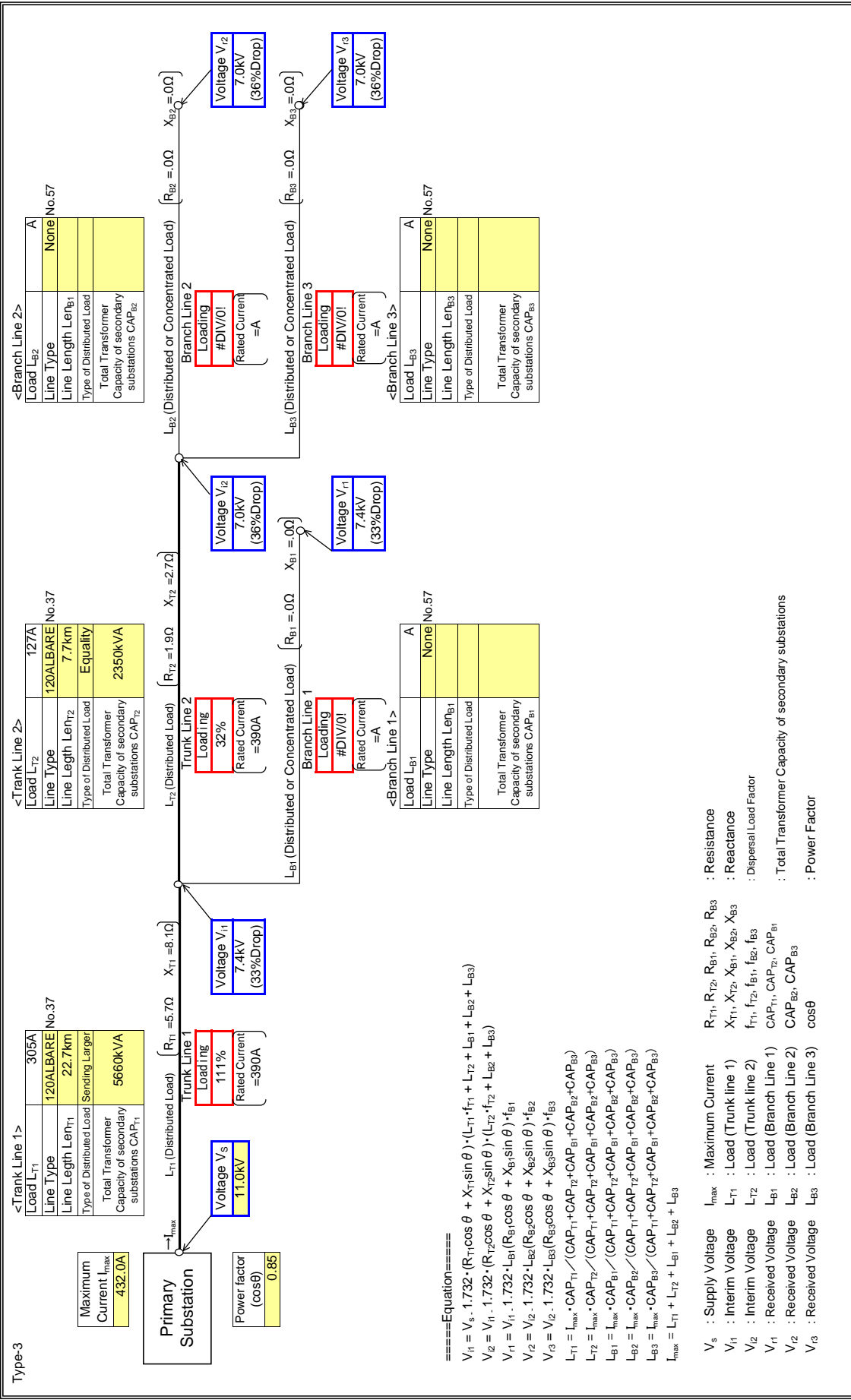
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

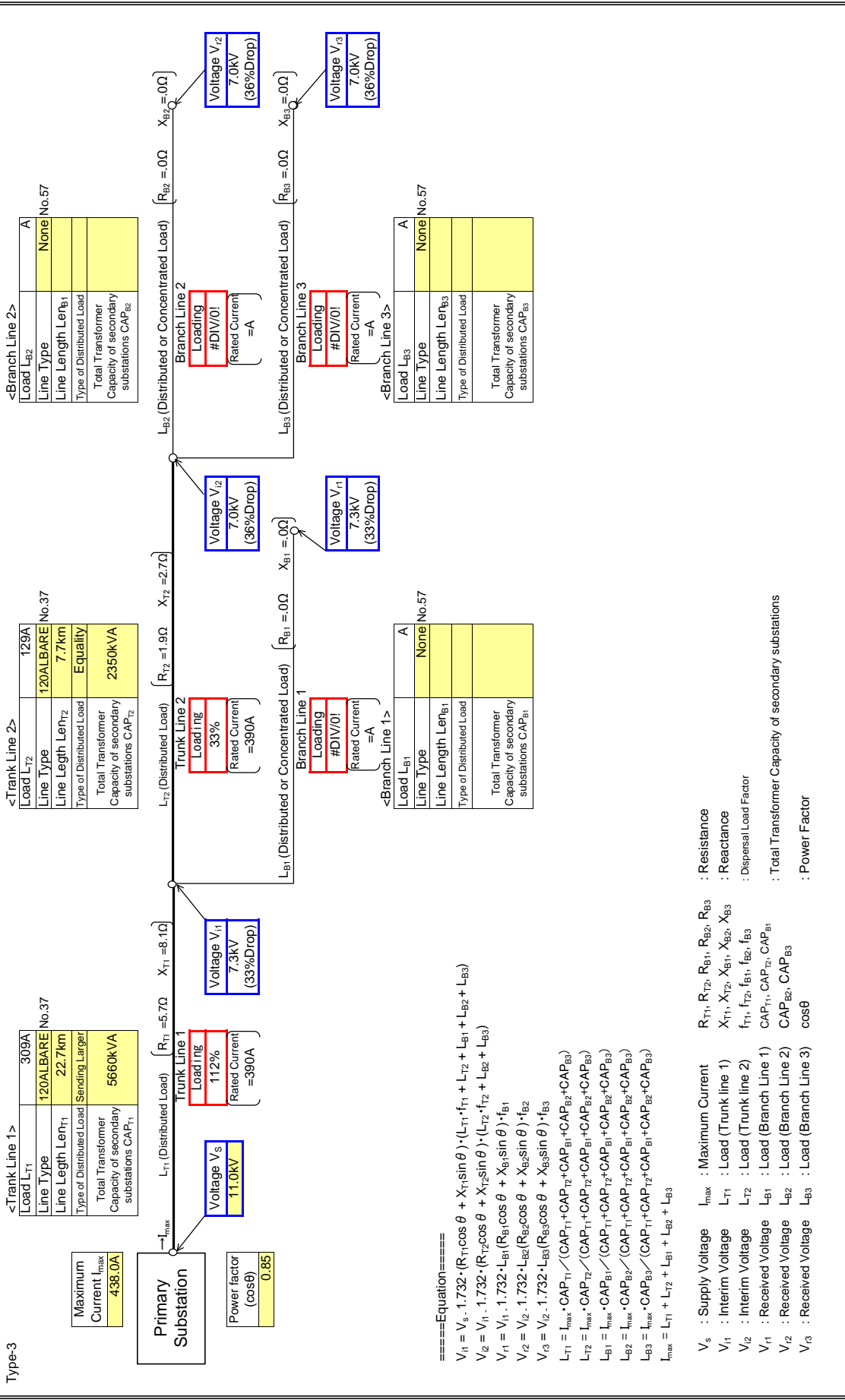
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

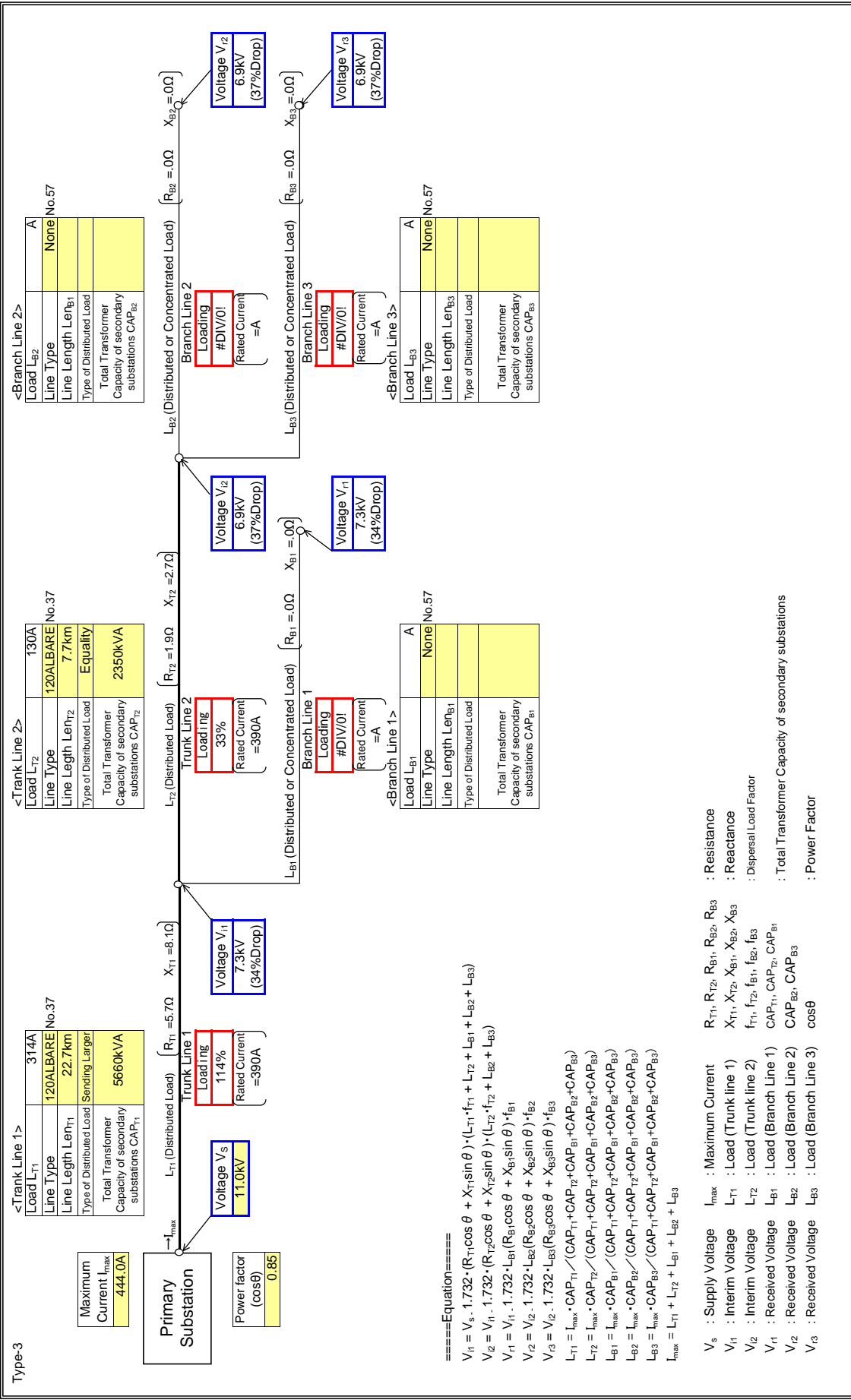
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

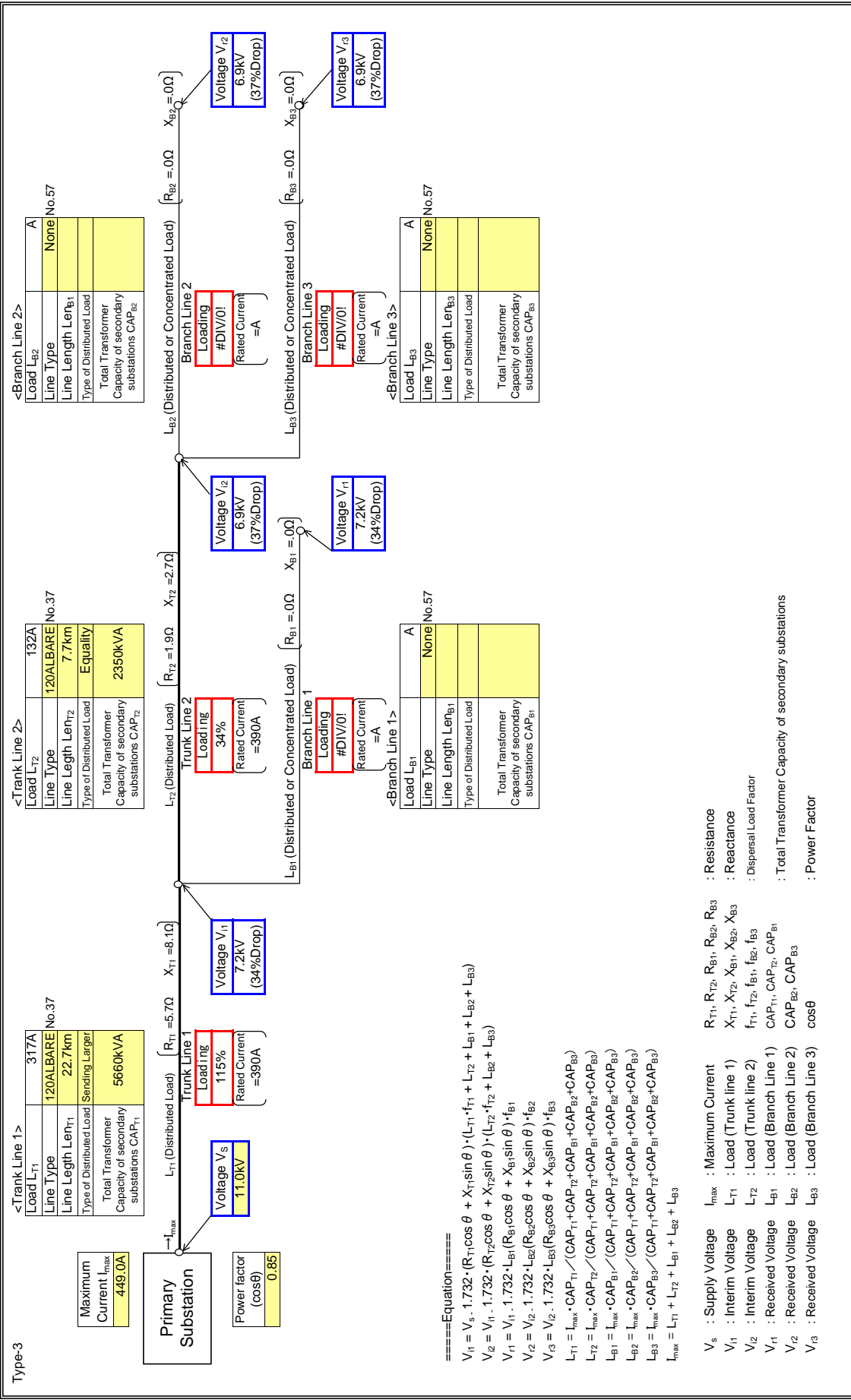
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

Type-3 : Input data in colored cells



====Equation====
 $V_{T1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{L2} = V_{T1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{L1} = V_{T1} \cdot 1.732 \cdot L_{B1} \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{L2} = V_{L2} \cdot 1.732 \cdot L_{B2} \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{L3} = V_{L2} \cdot 1.732 \cdot L_{B3} \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

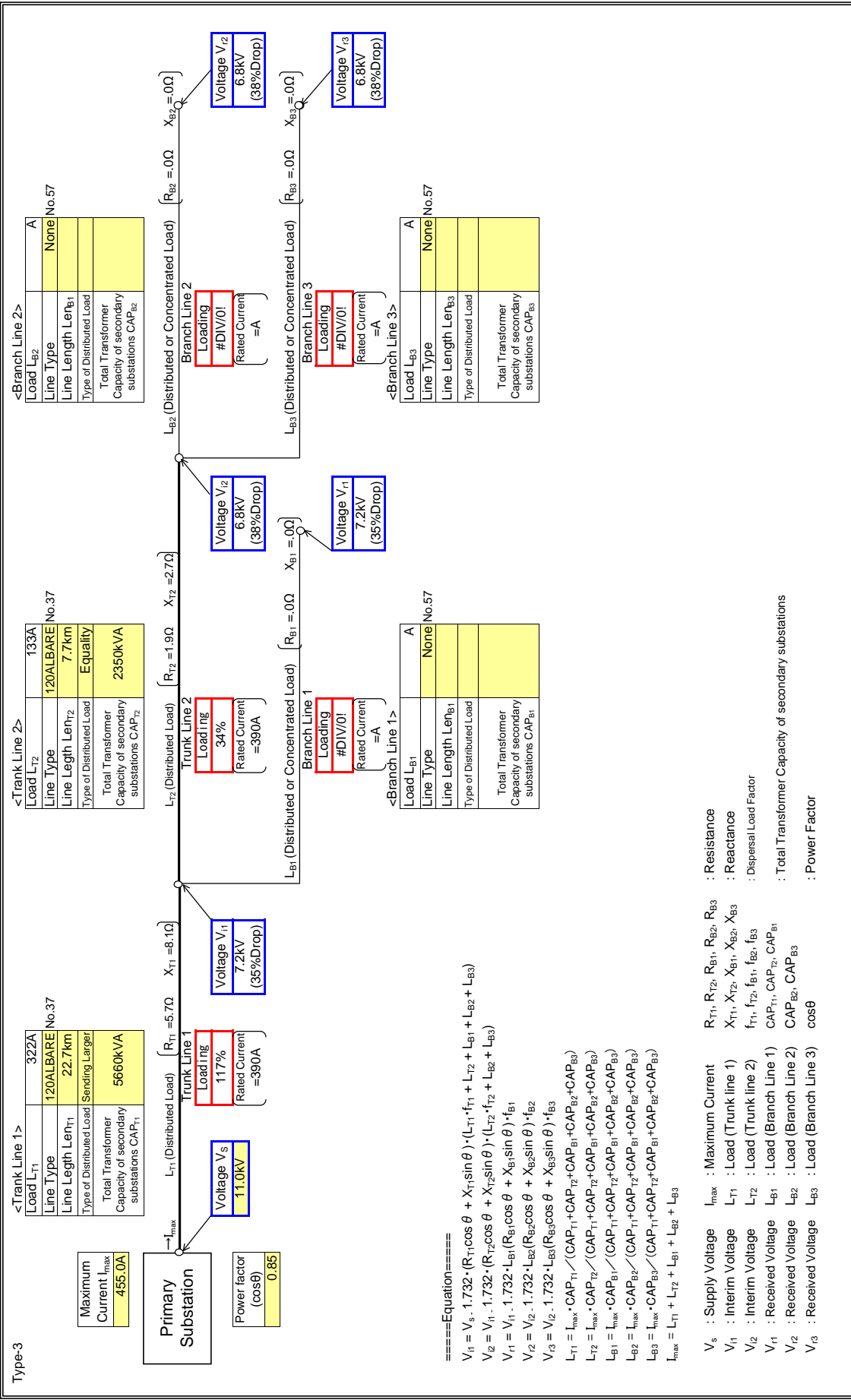
$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$
 $I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$

- V_s : Supply Voltage
- V_{T1} : Interim Voltage
- V_{L2} : Interim Voltage
- V_{L1} : Received Voltage
- V_{L2} : Received Voltage
- V_{L3} : Received Voltage
- I_{max} : Maximum Current
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

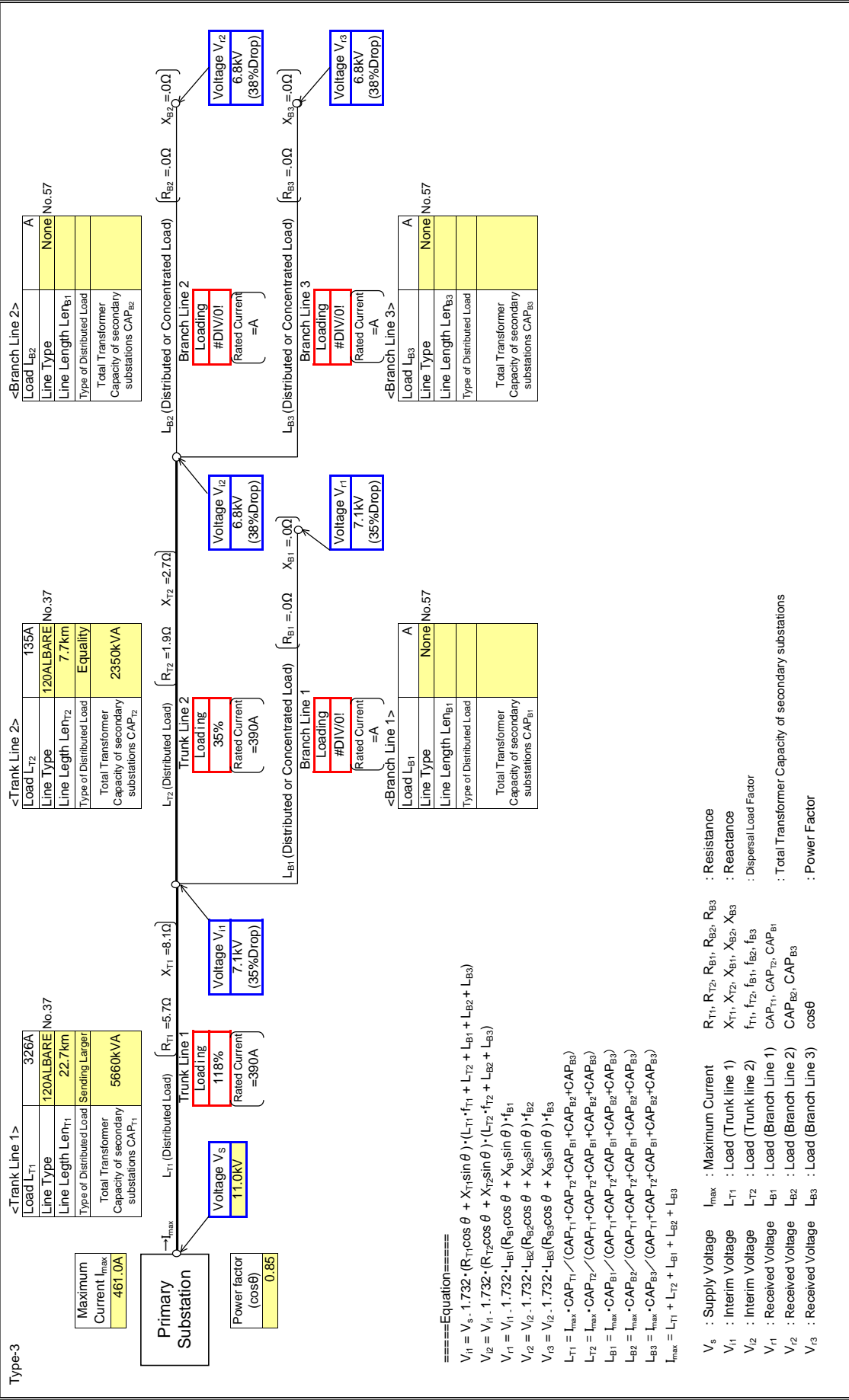
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

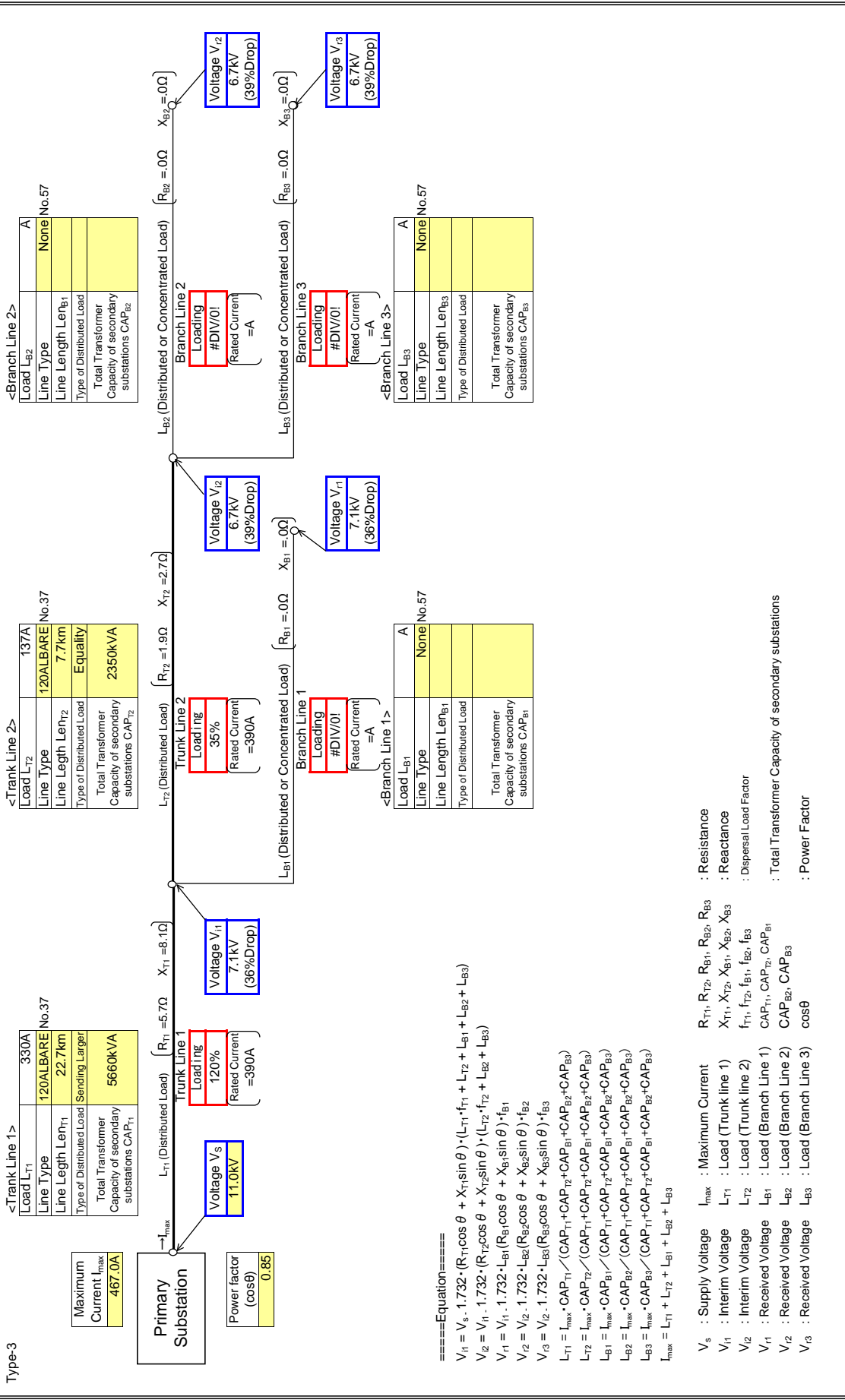
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

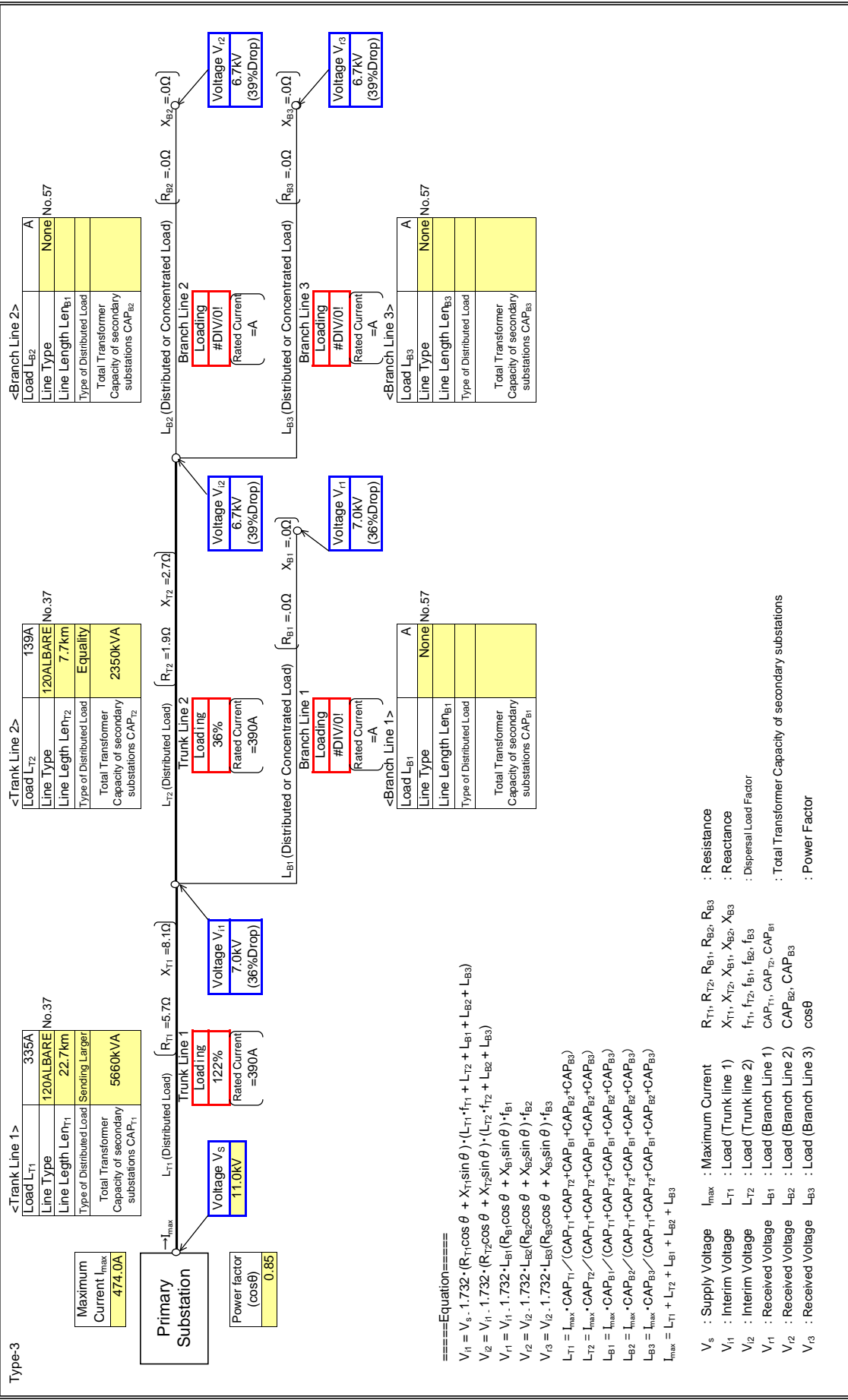
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Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S10

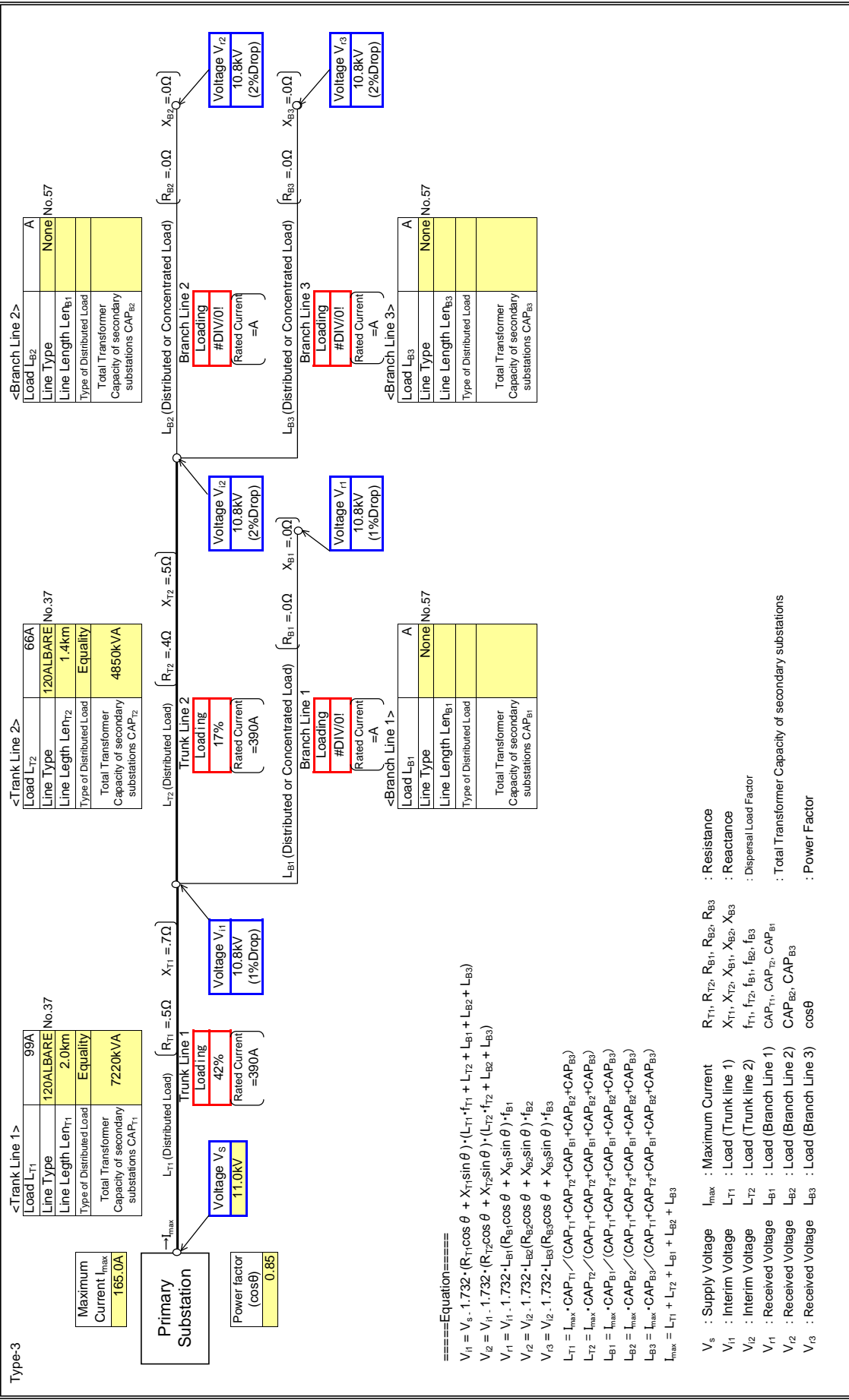
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

Input data in colored cells



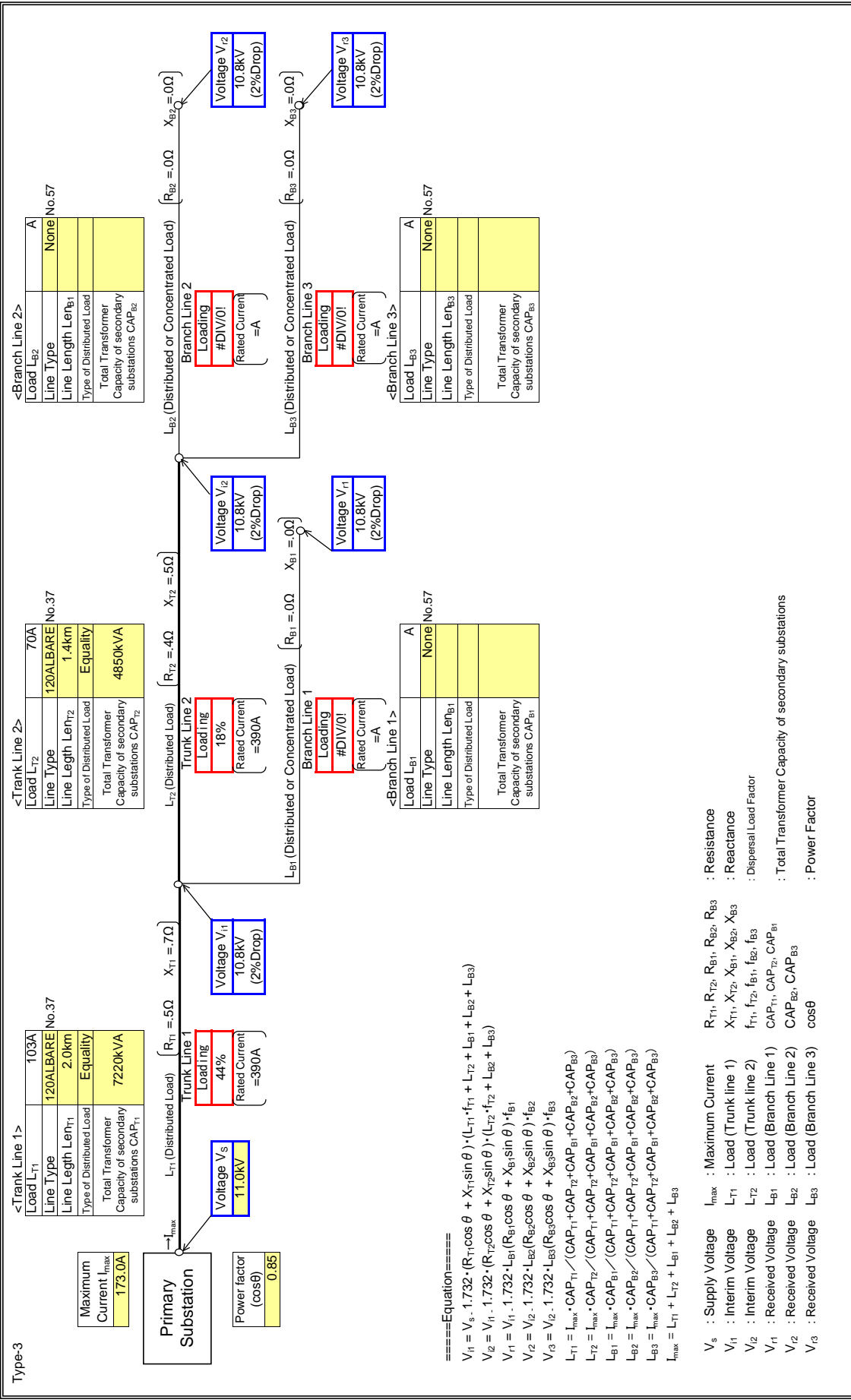
====Equation====
 $V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{i2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{i3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- L_{T1} : Load (Trunk line 1)
- L_{T2} : Load (Trunk line 2)
- L_{B1} : Load (Branch Line 1)
- L_{B2} : Load (Branch Line 2)
- L_{B3} : Load (Branch Line 3)
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

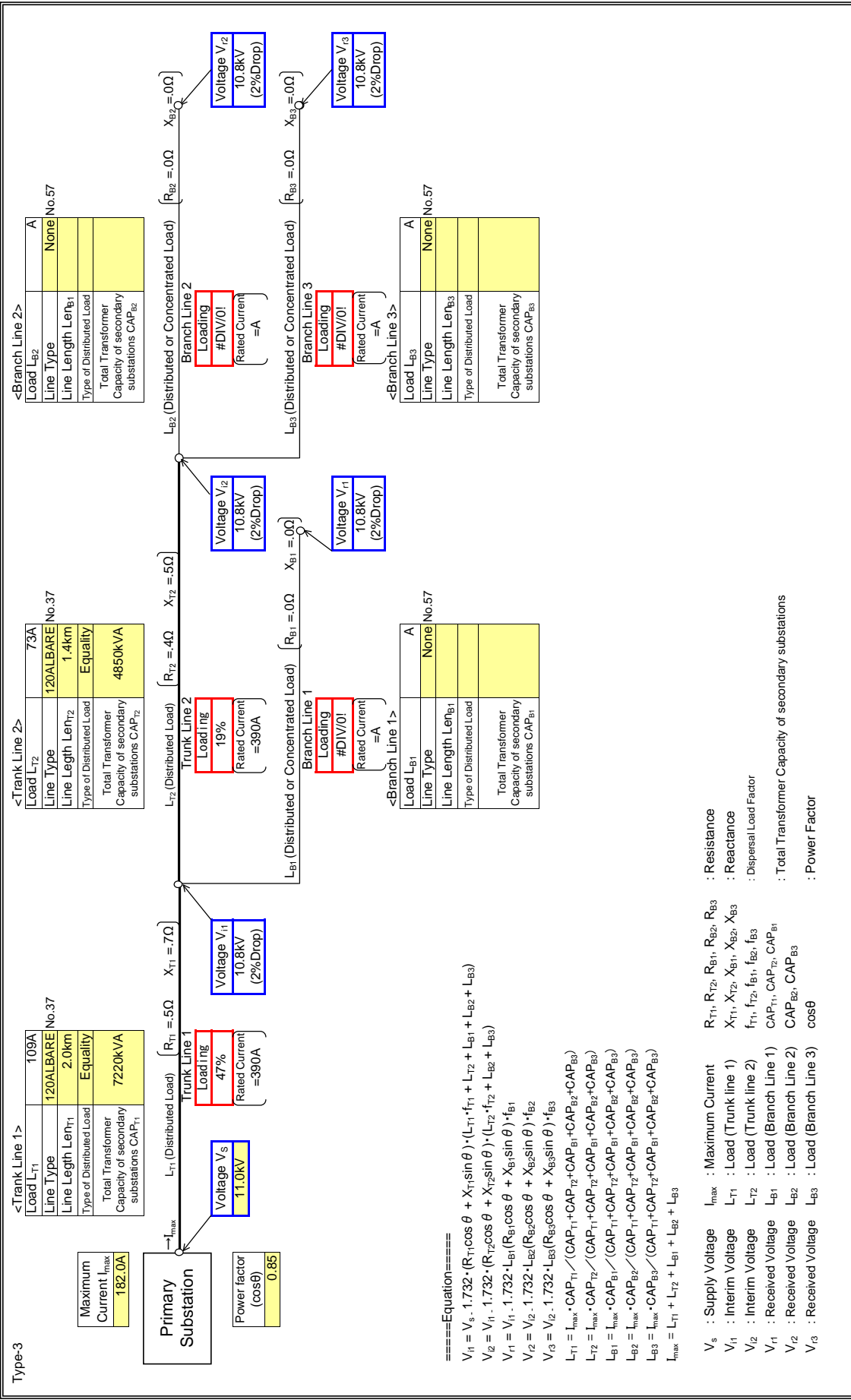
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

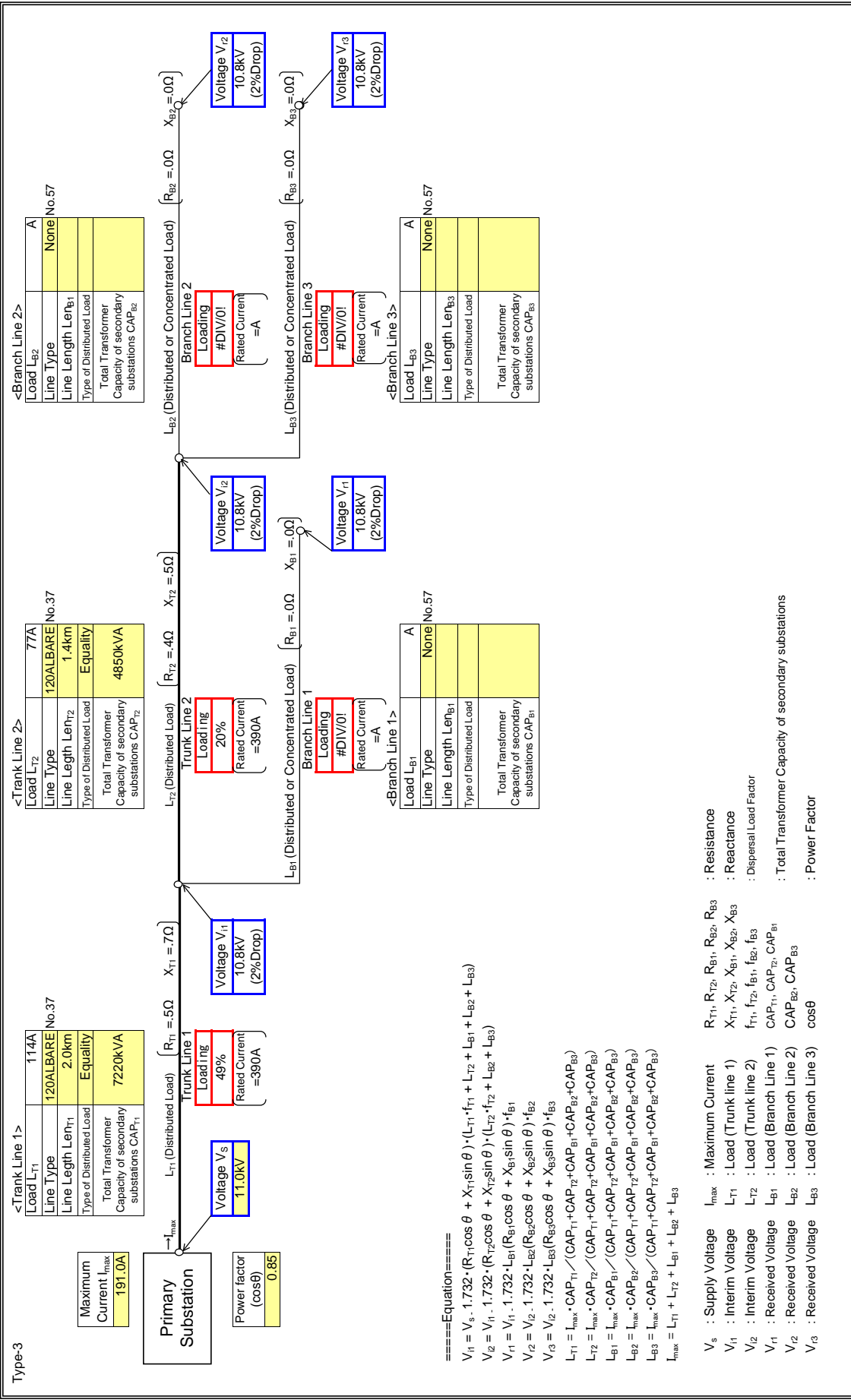
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

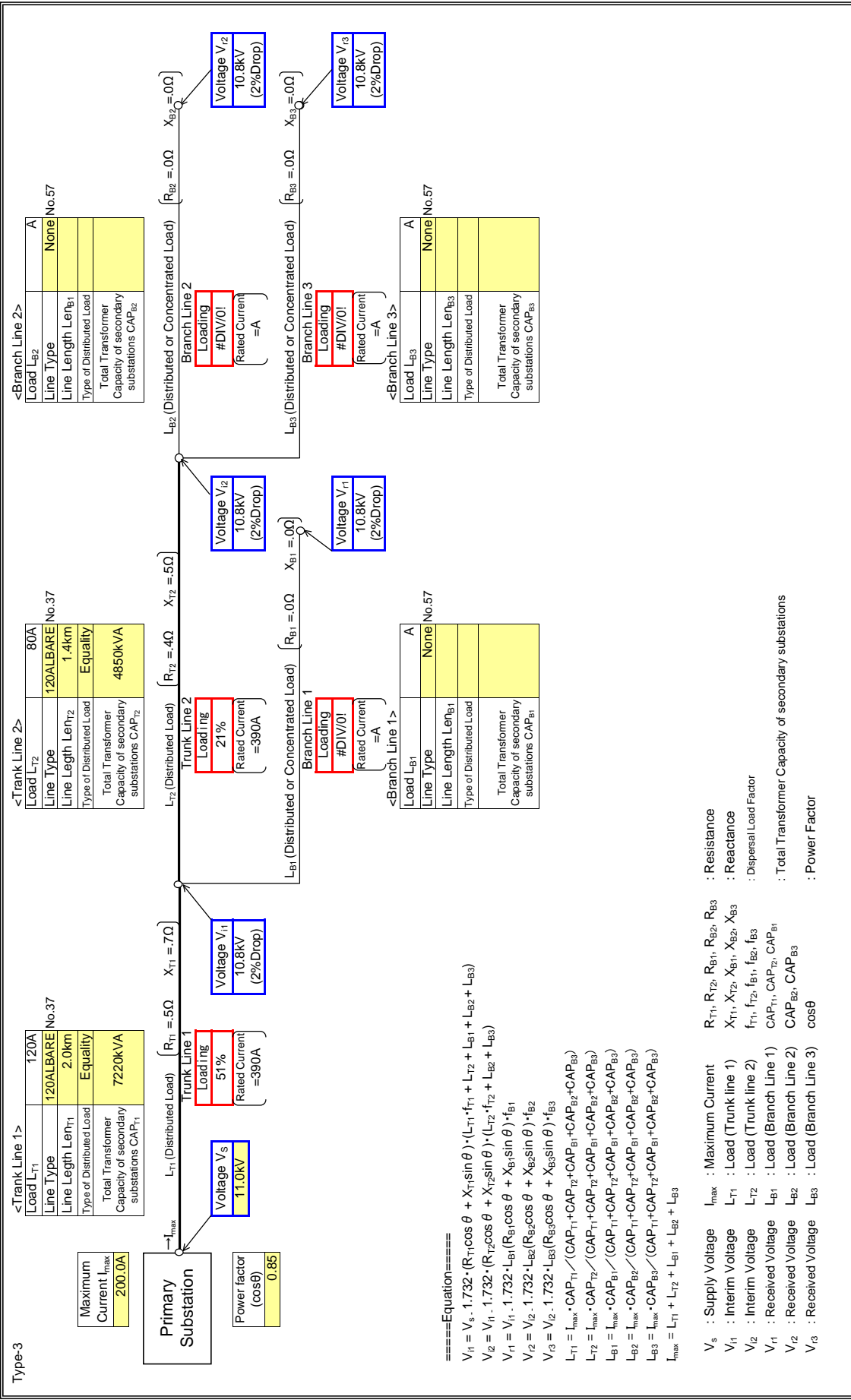
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

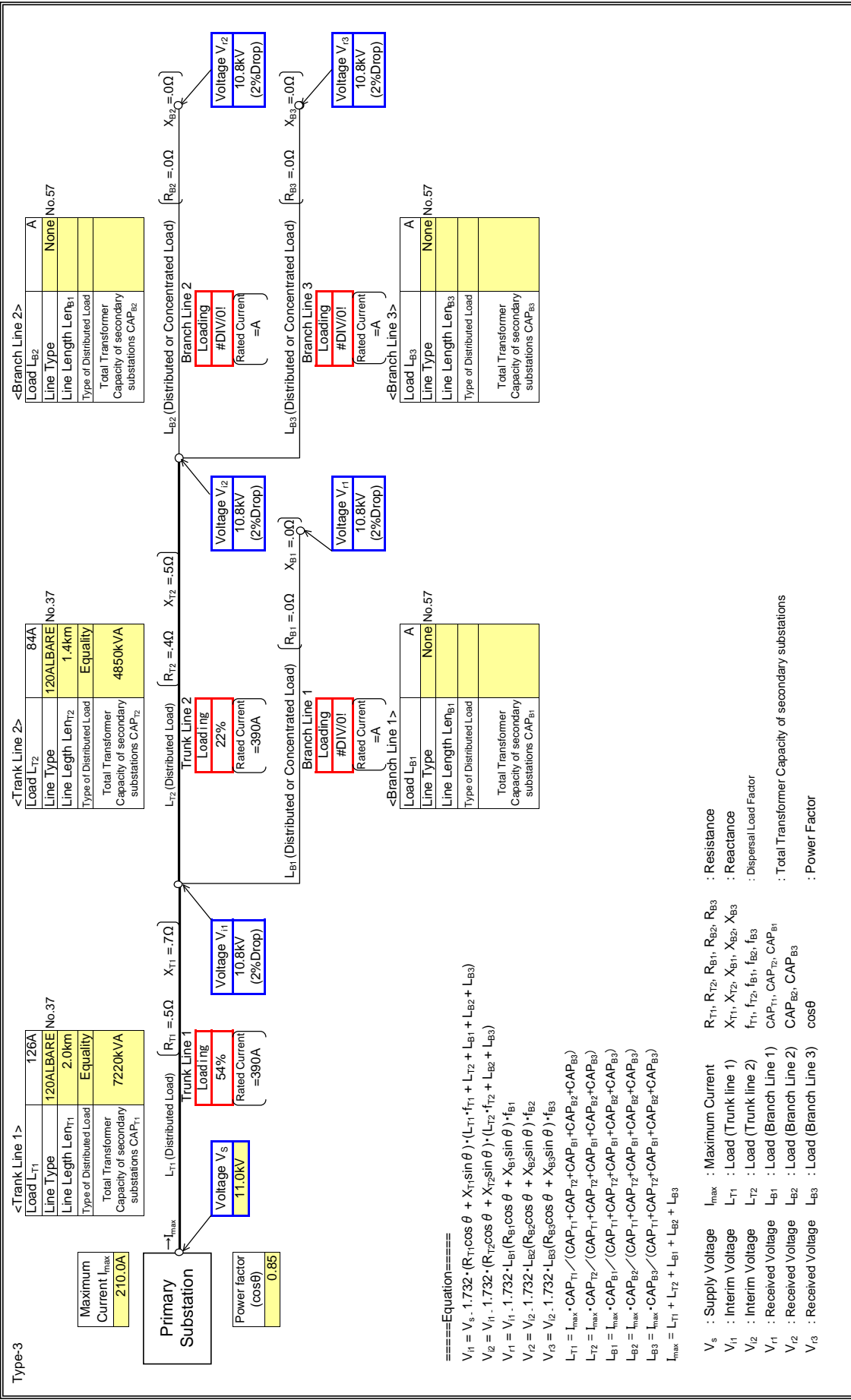
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

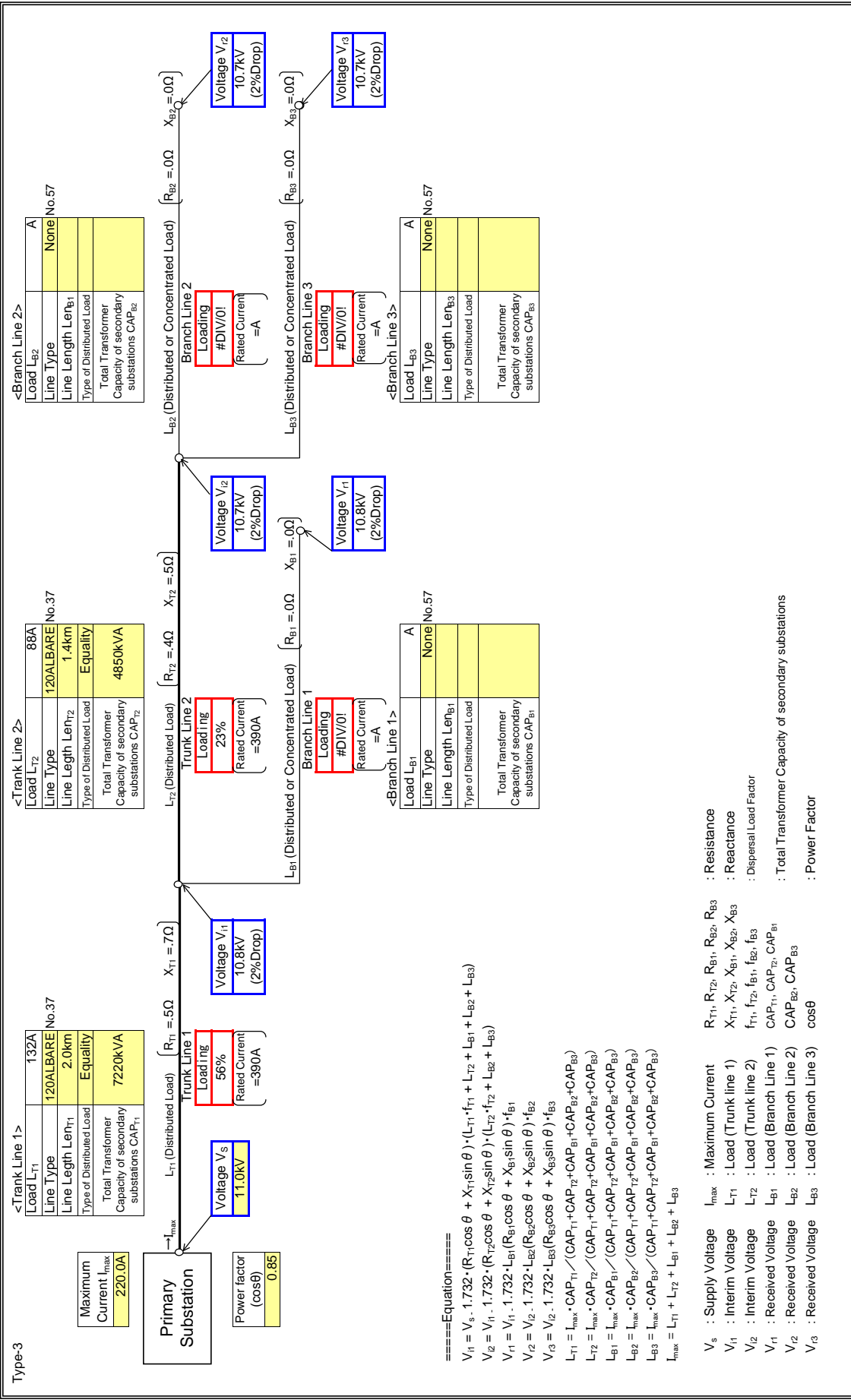
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

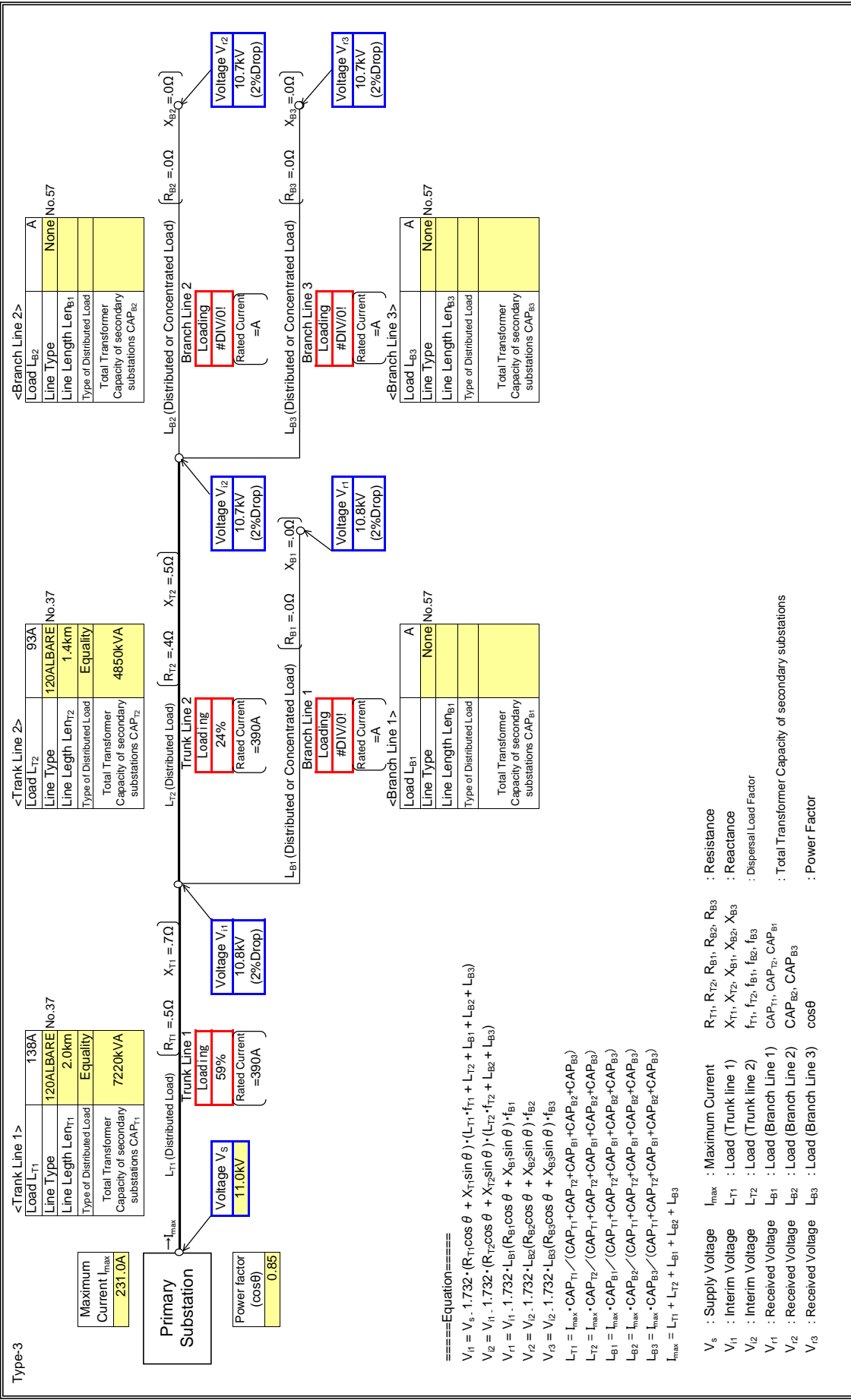
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

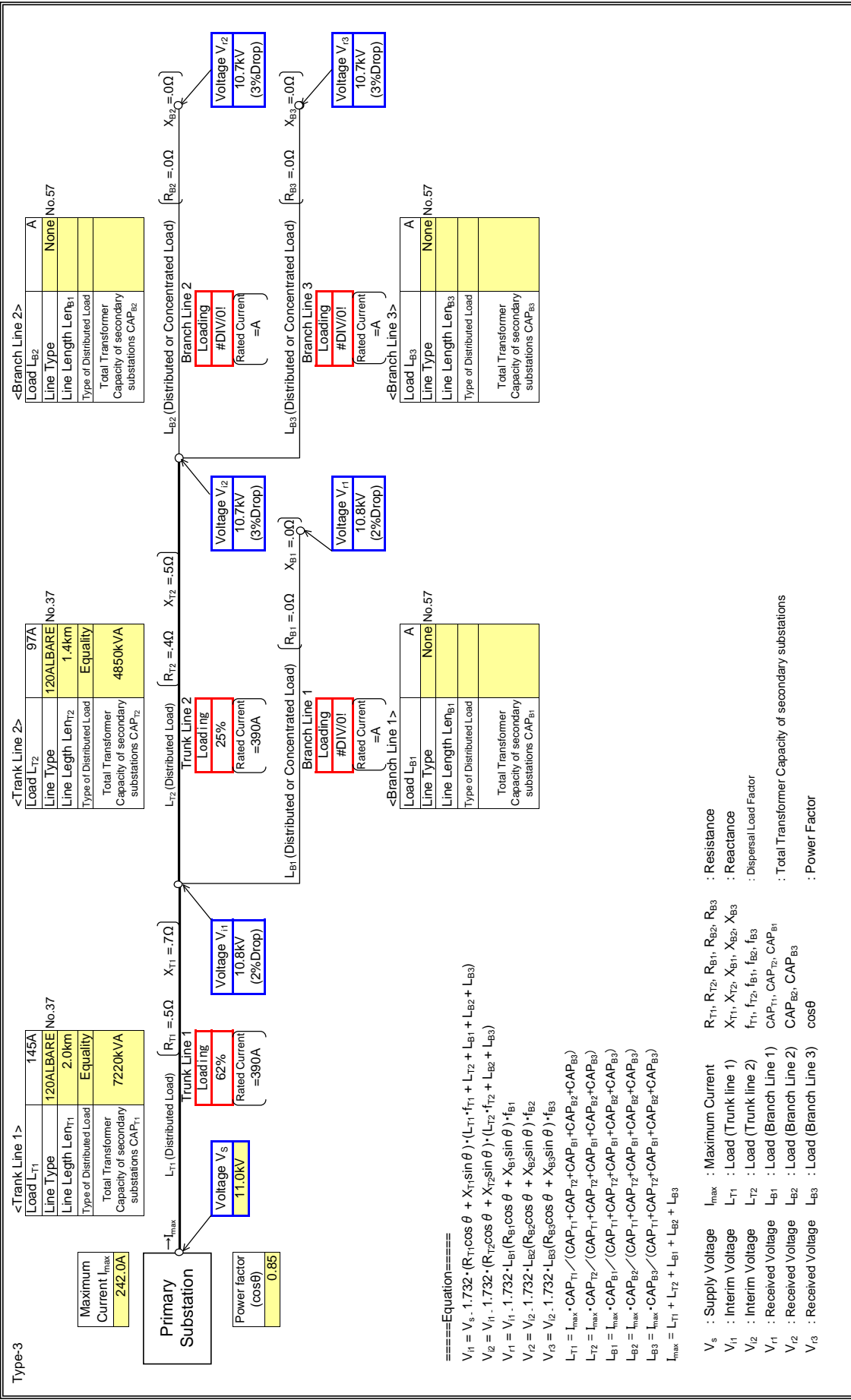
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

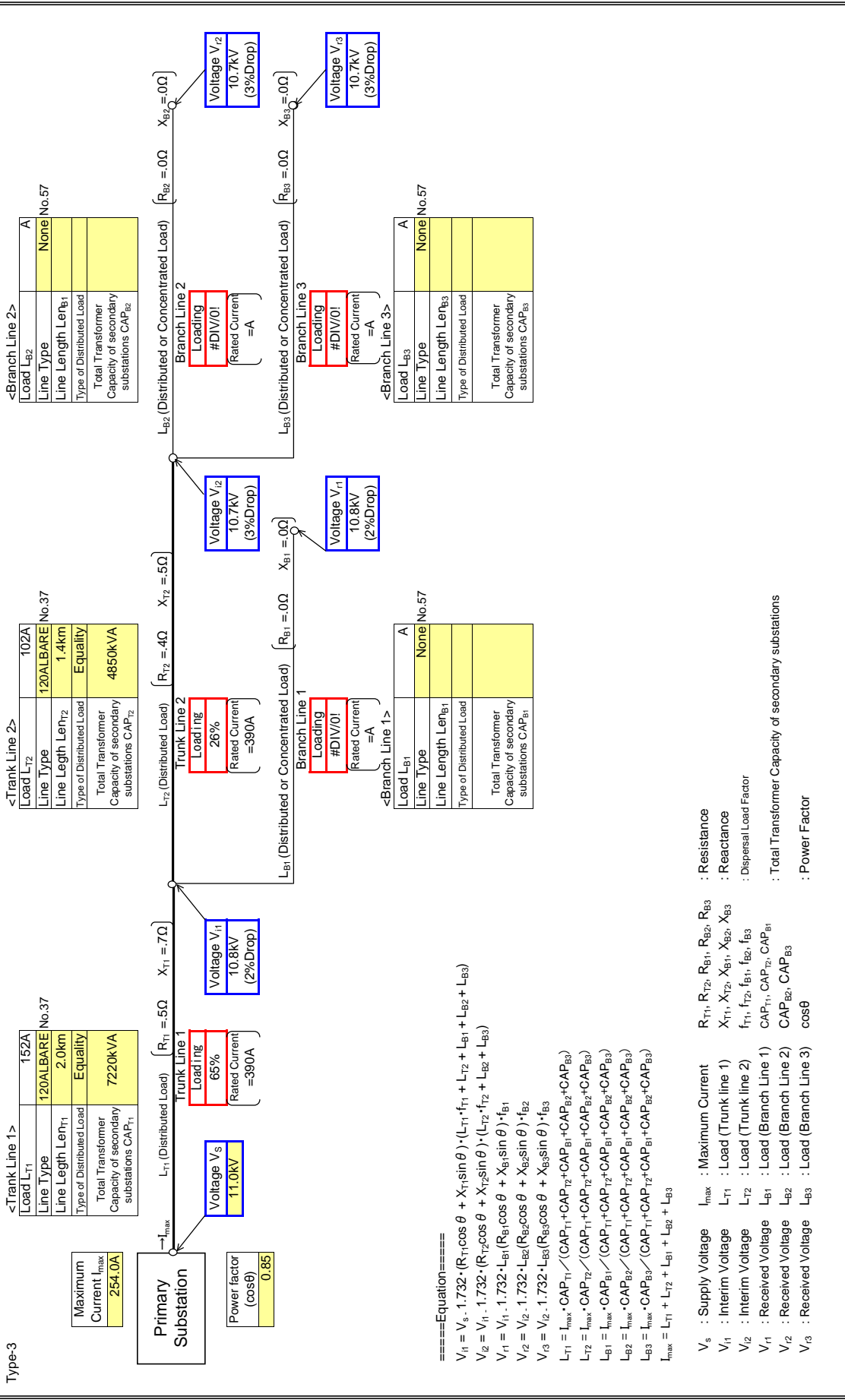
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

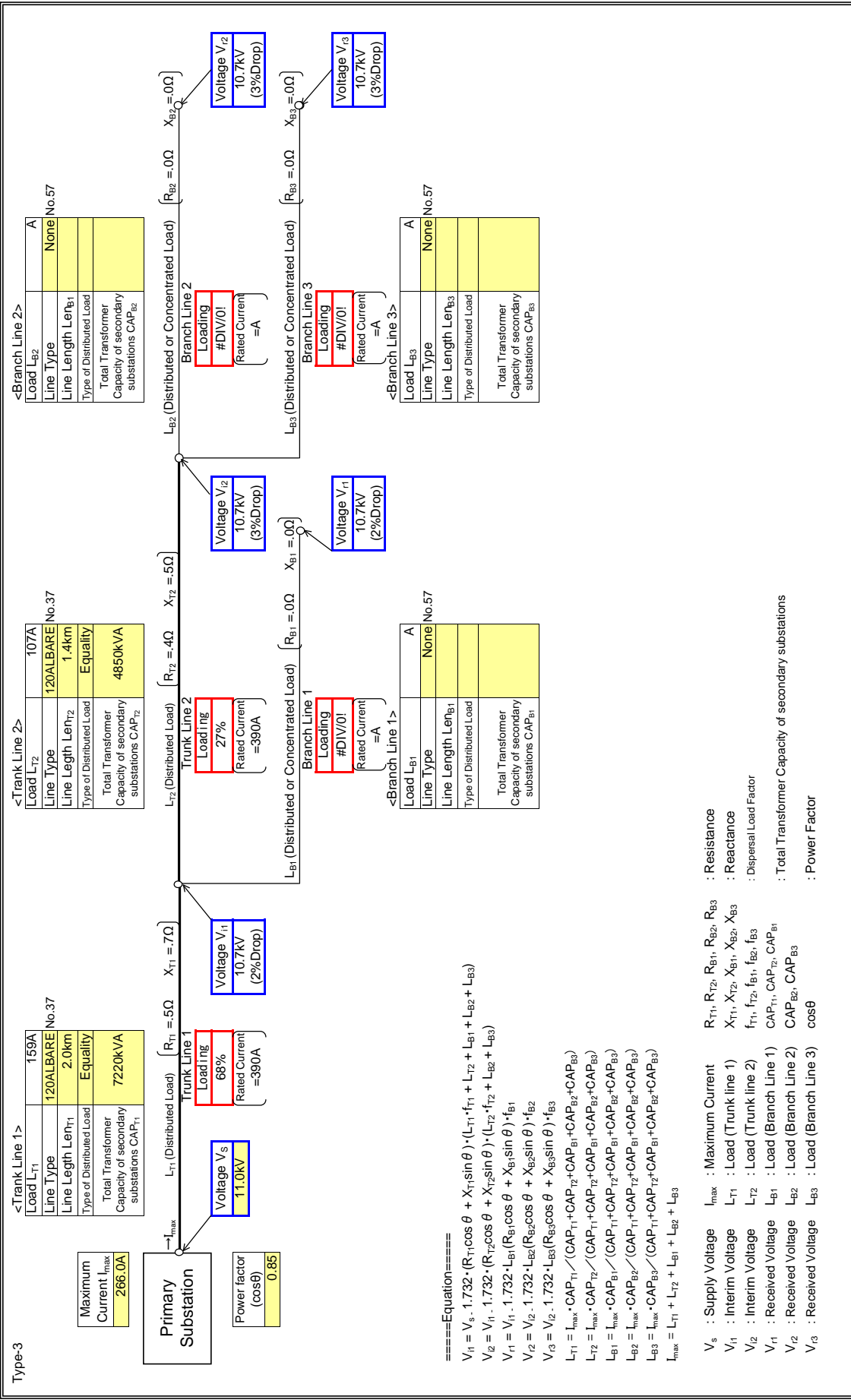
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

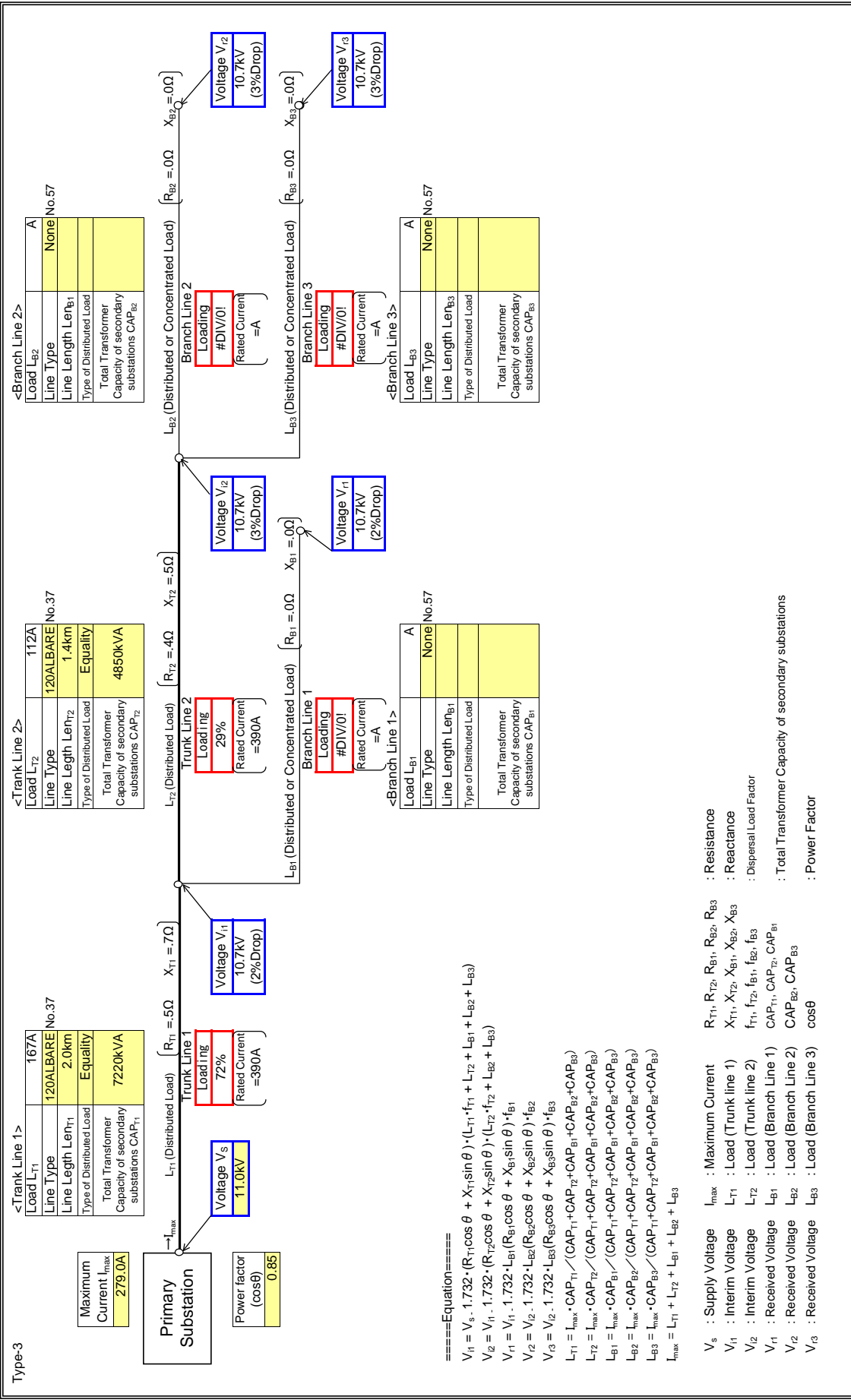
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION S
Feeder Name	S11

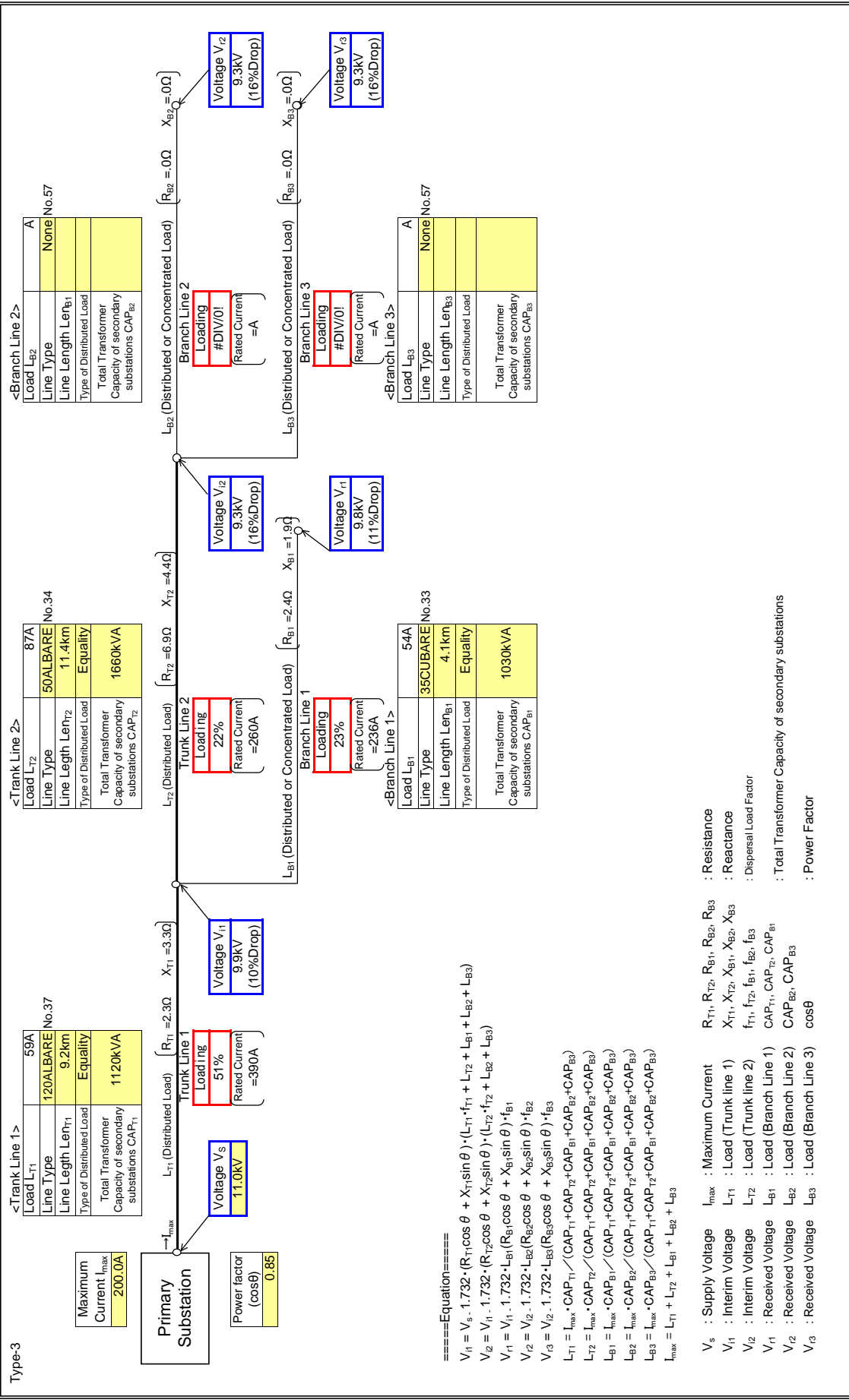
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

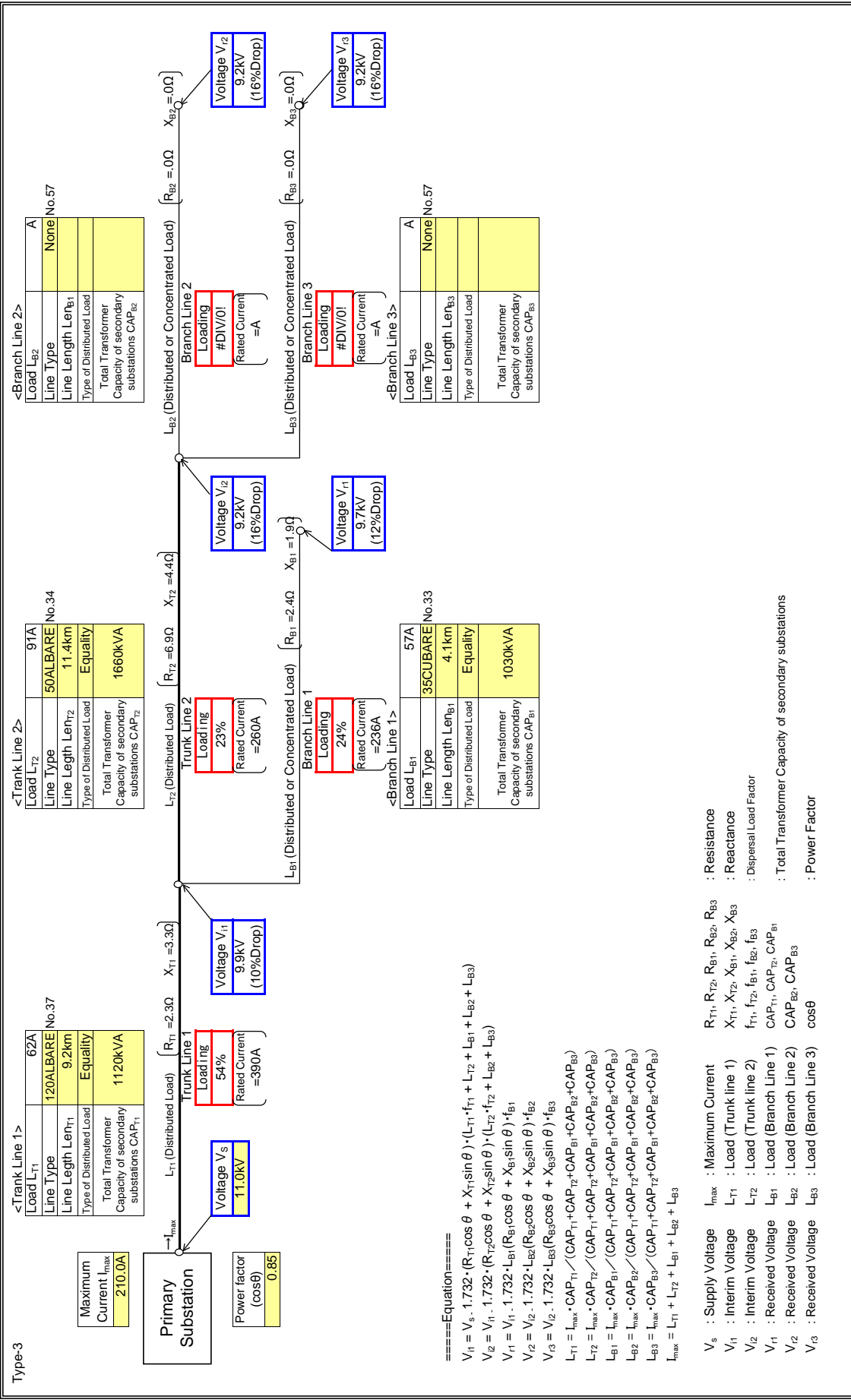
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

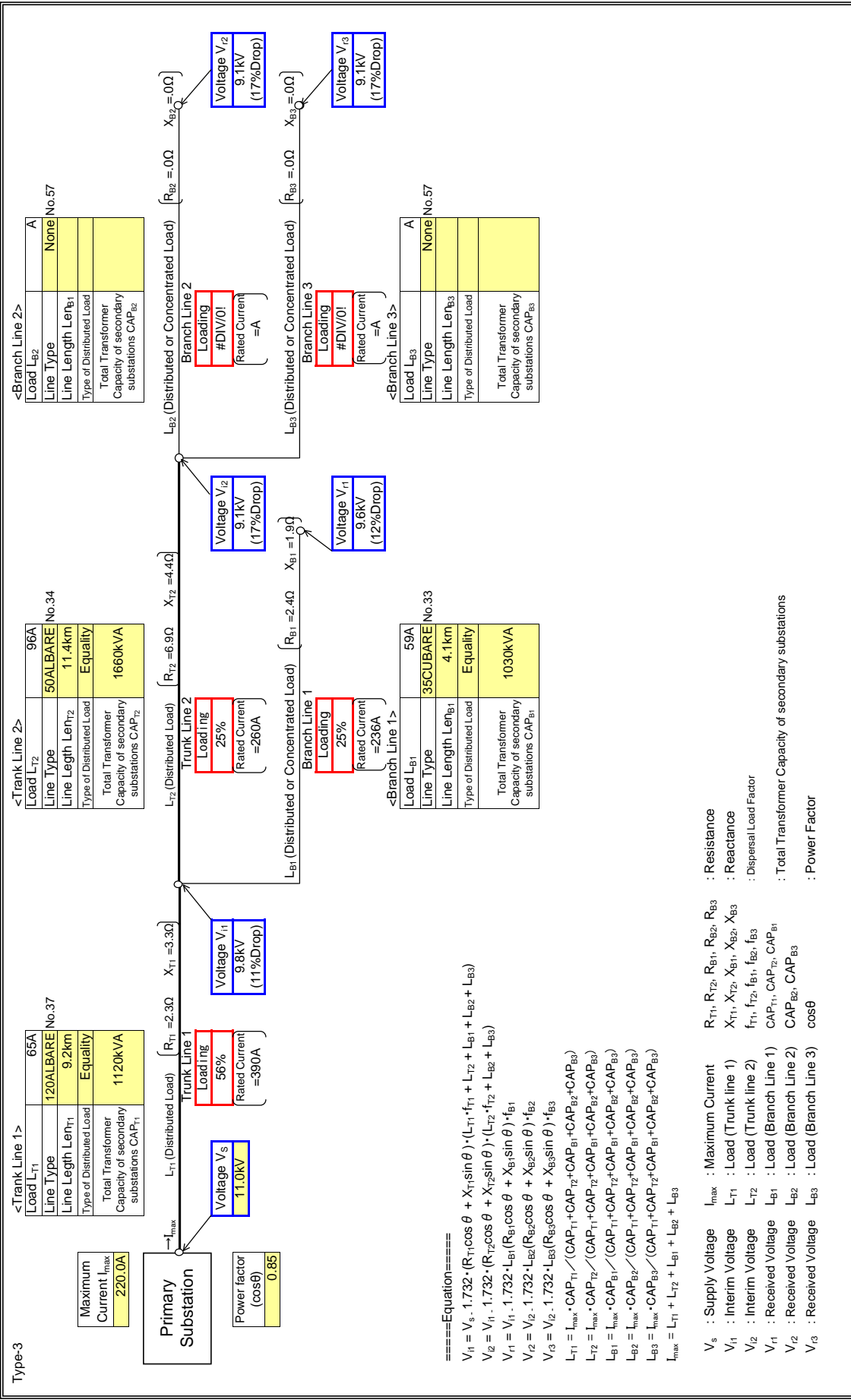
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

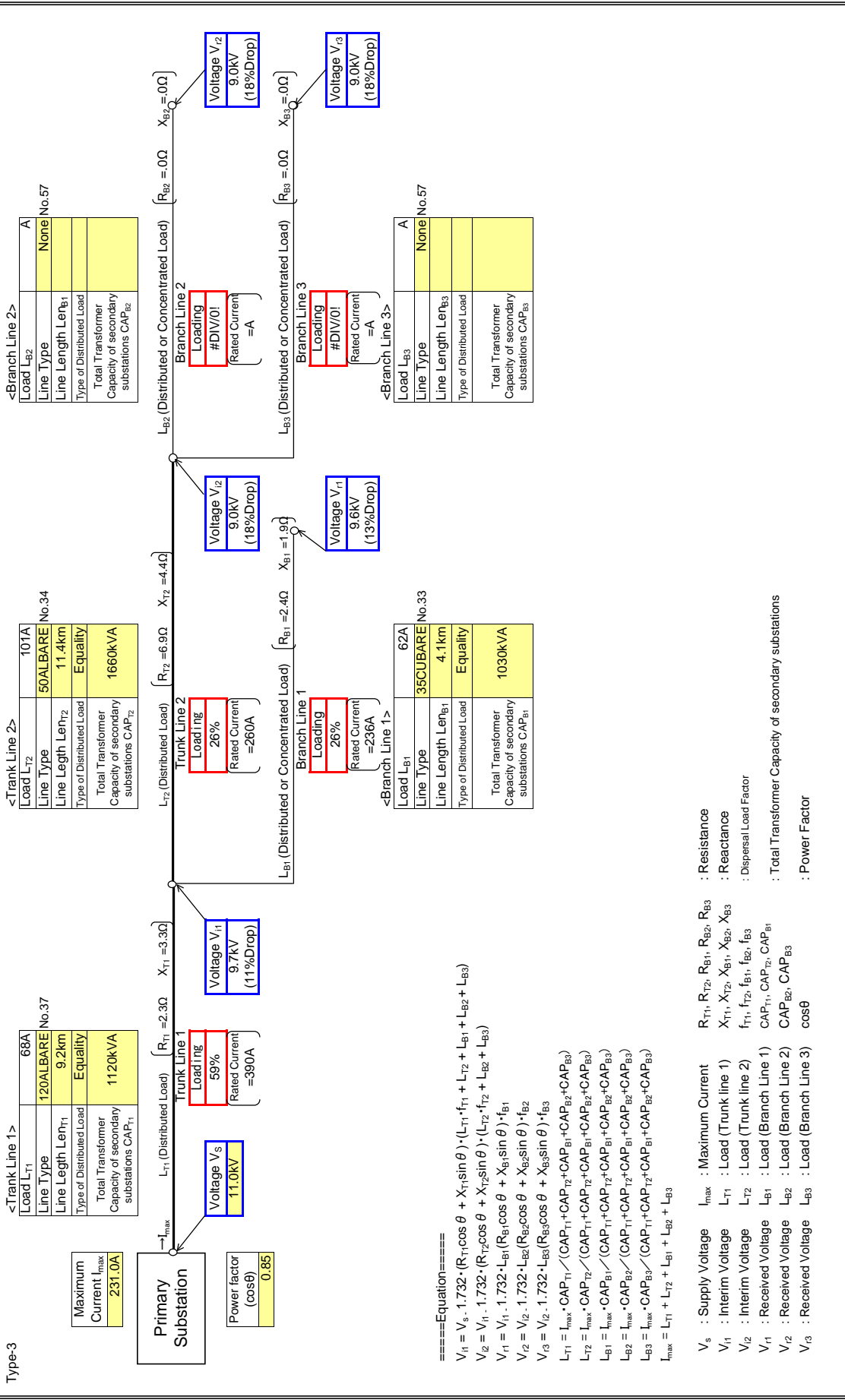
Type-3 : Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

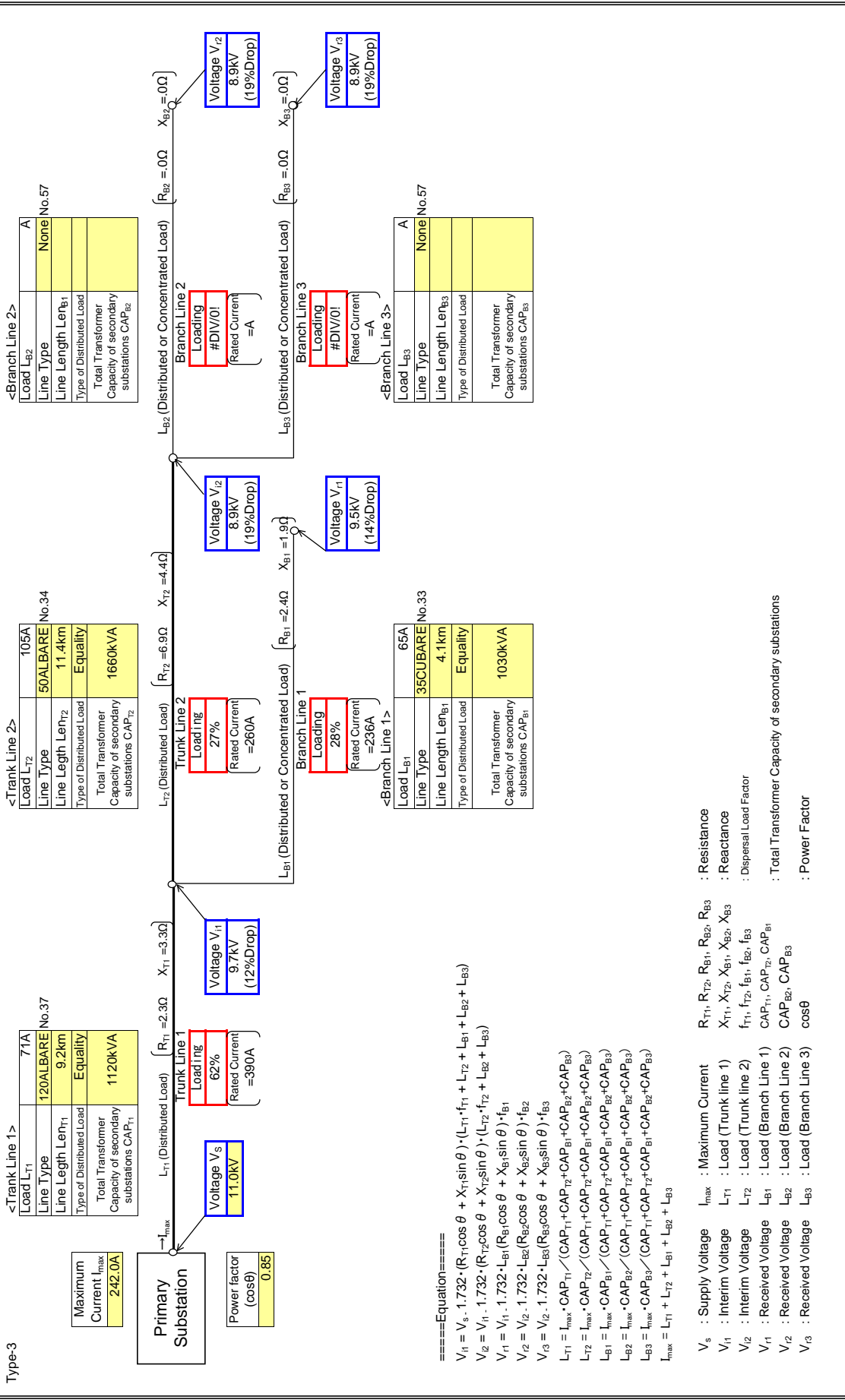
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

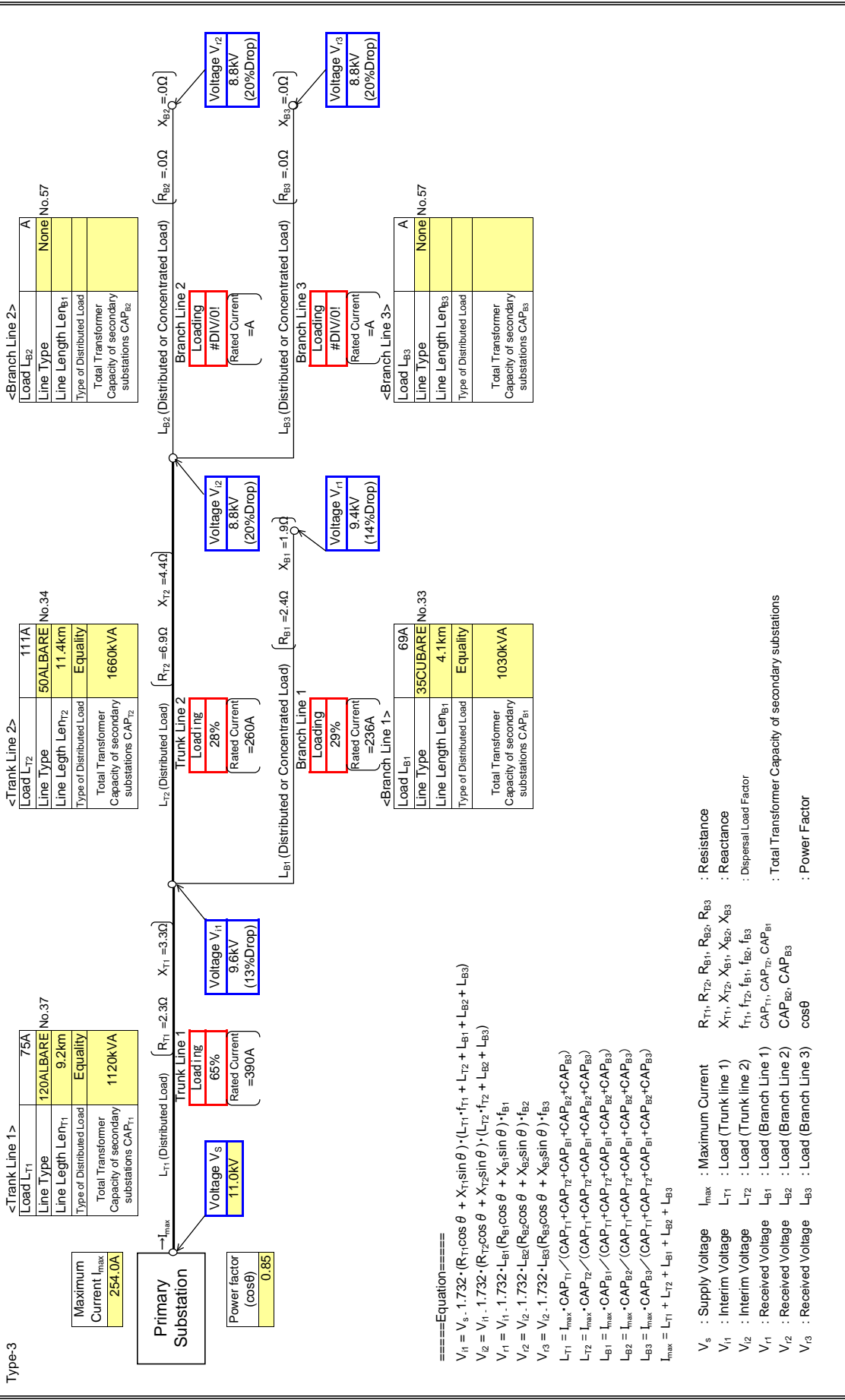
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

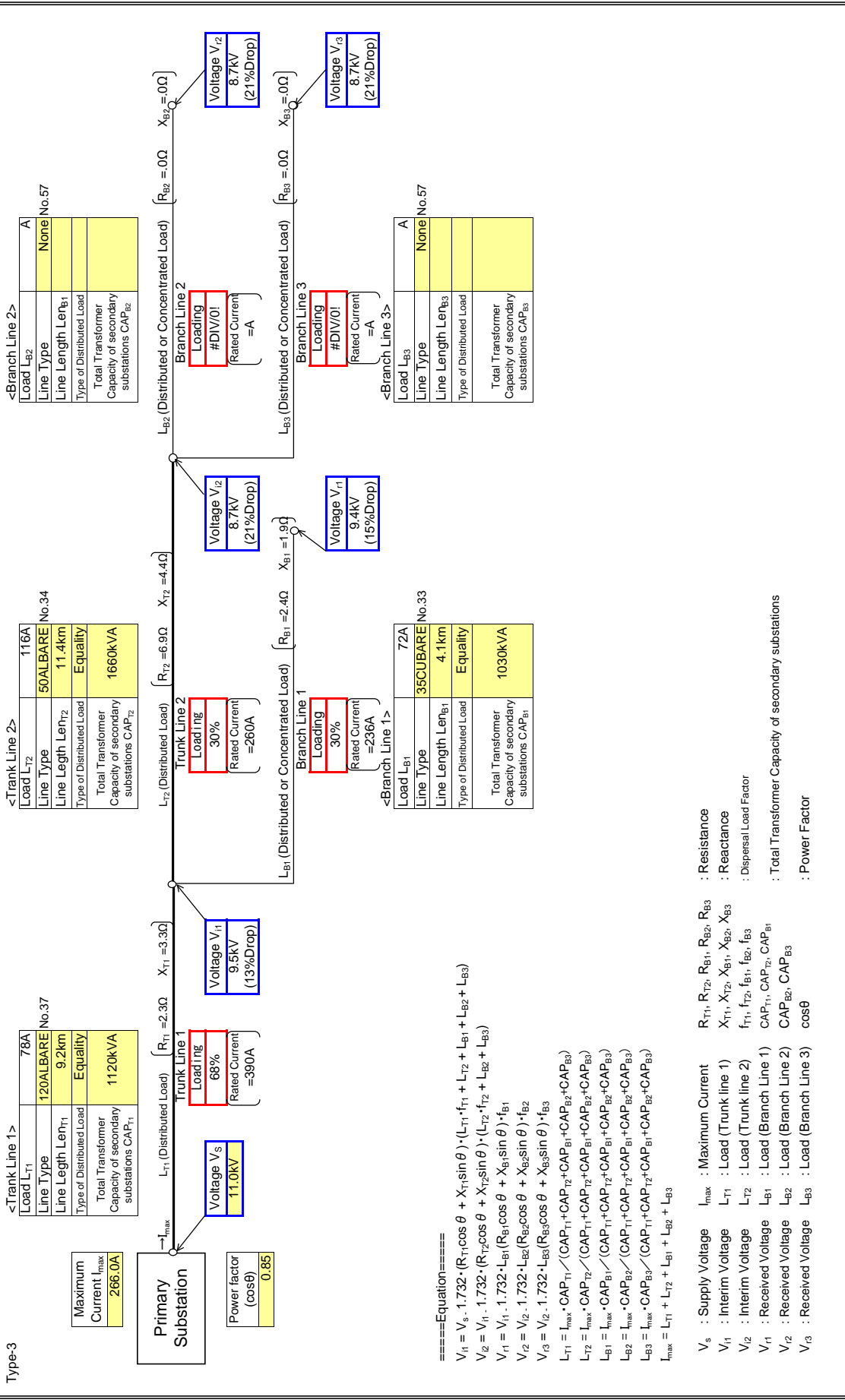
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

Input data in colored cells



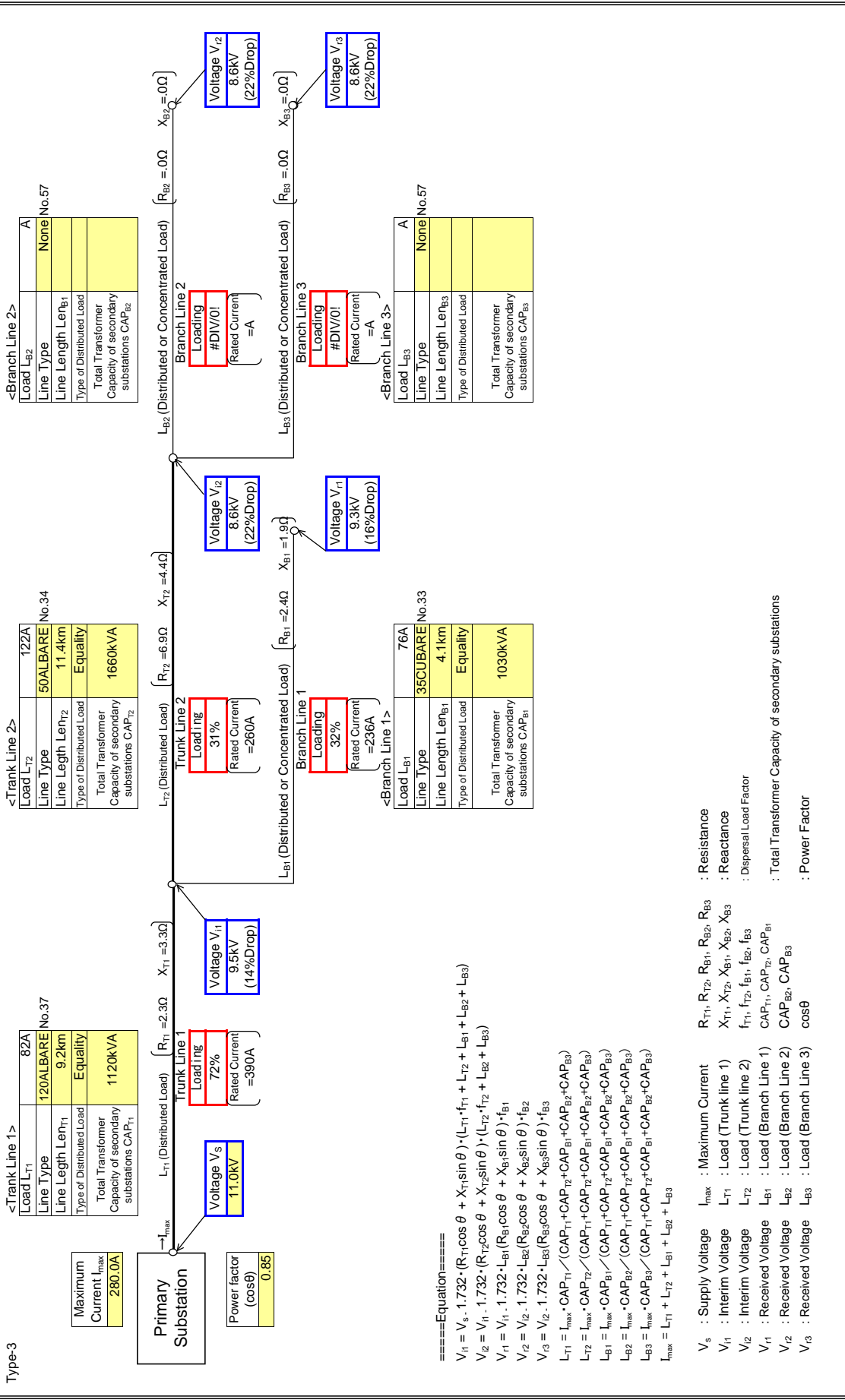
====Equation====
 $V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$
 $V_{r4} = V_{r2} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$
 $V_{r5} = V_{r2} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- L_{T1}, L_{T2} : Load (Trunk line 1)
- L_{T2}, L_{T2} : Load (Trunk line 2)
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- V_{r1} : Received Voltage
- L_{B1} : Load (Branch Line 1)
- $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- V_{r2} : Received Voltage
- L_{B2} : Load (Branch Line 2)
- CAP_{B2}, CAP_{B3} : Power Factor
- V_{r3} : Received Voltage
- L_{B3} : Load (Branch Line 3)
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

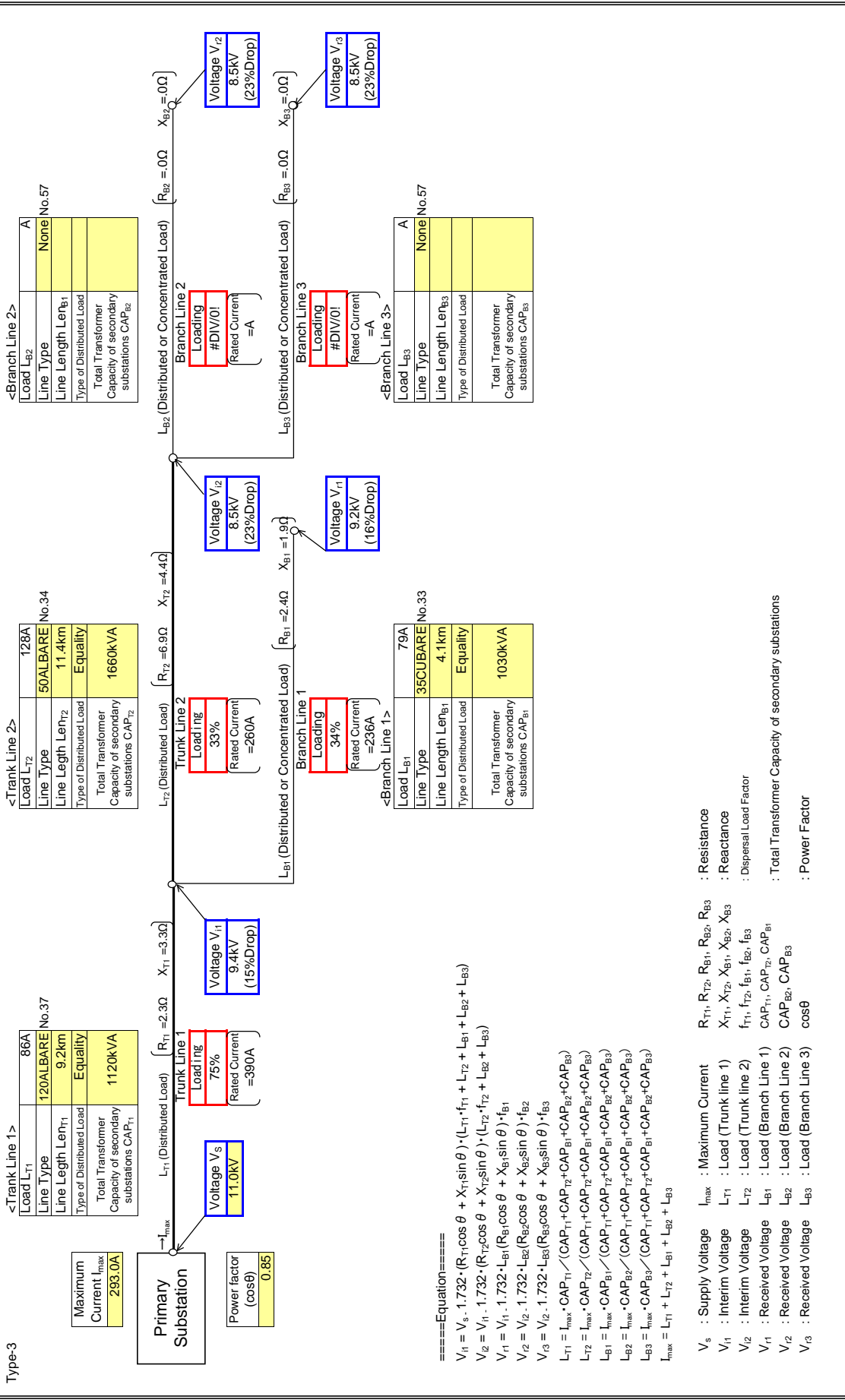
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

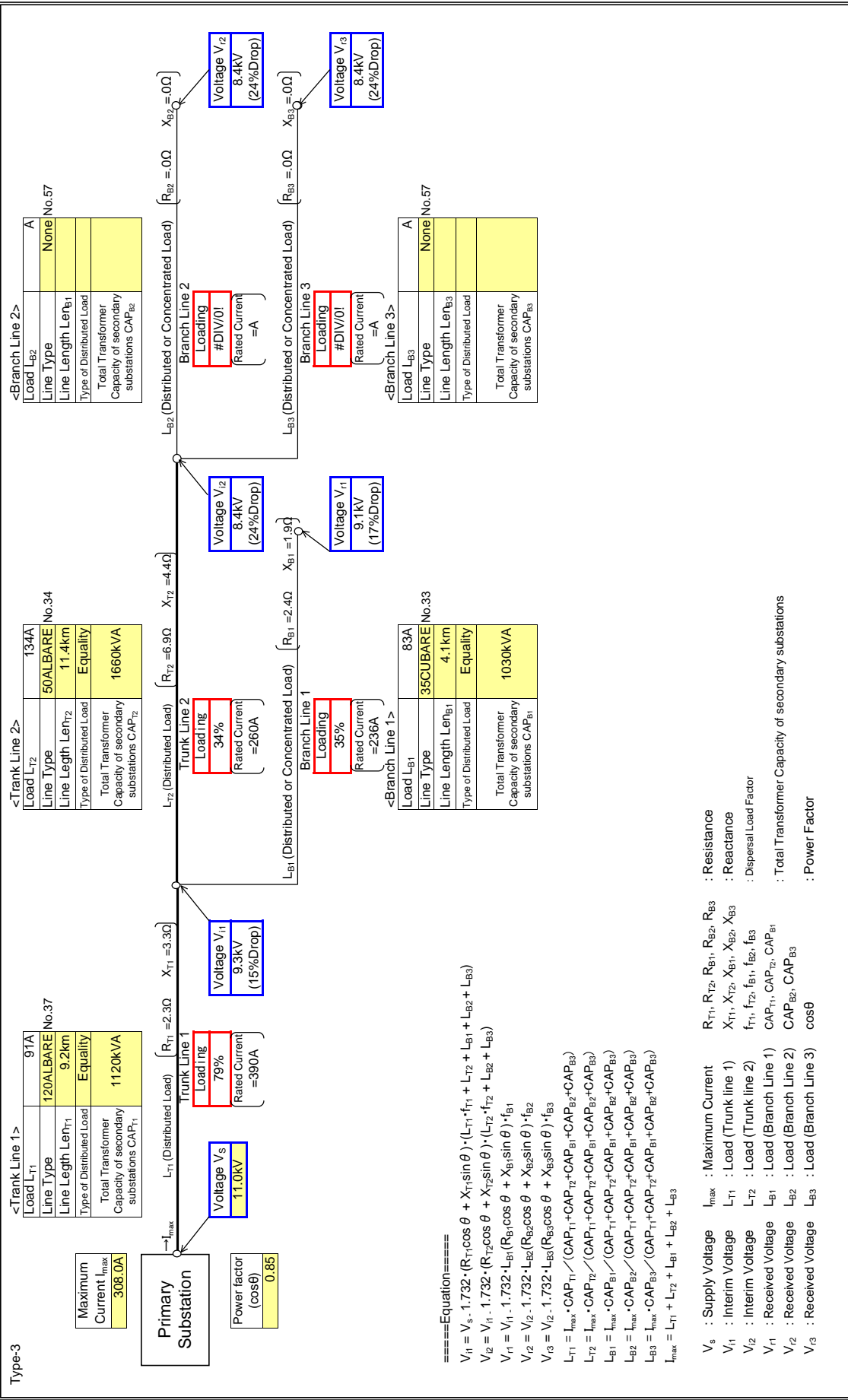
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

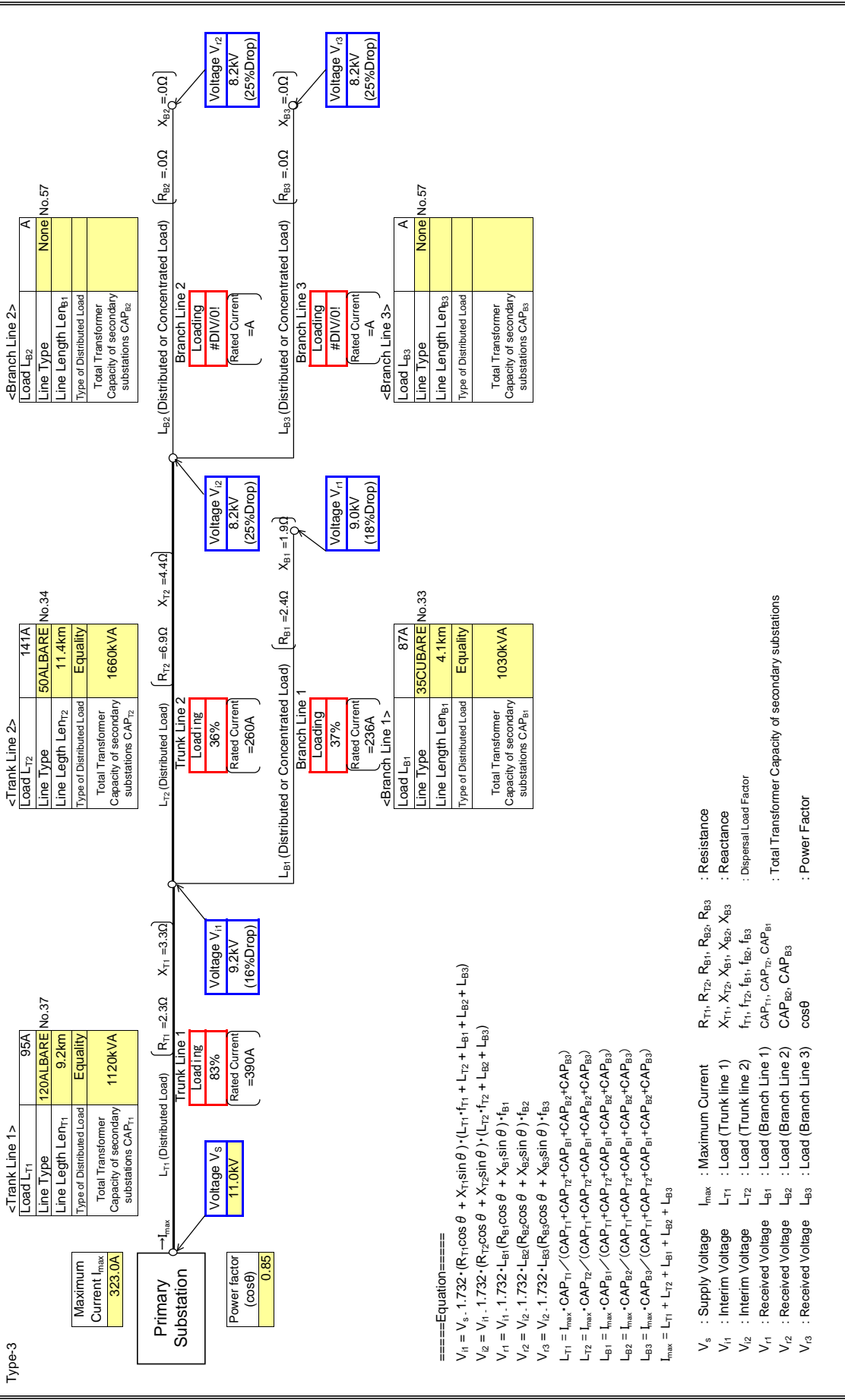
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

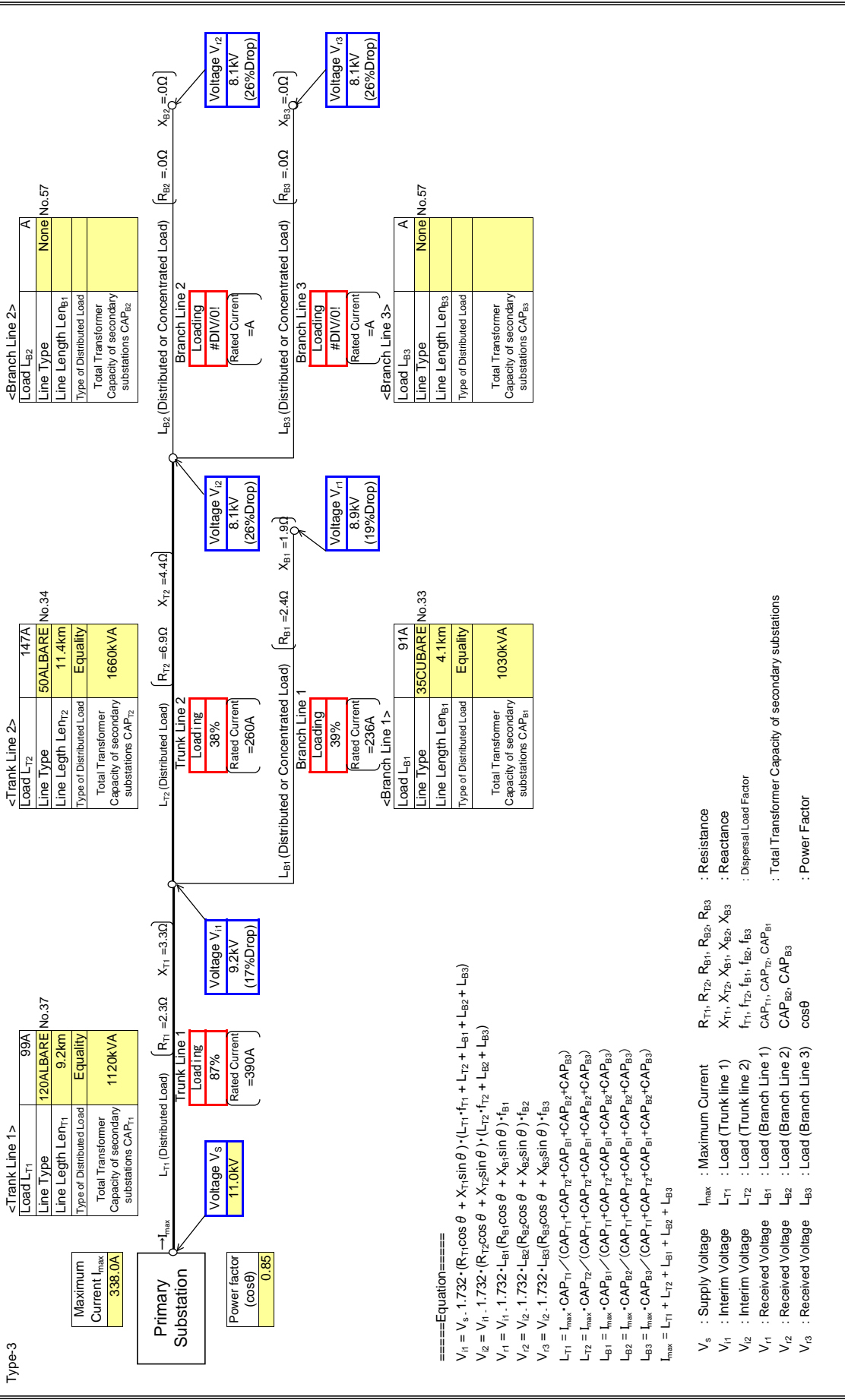
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION Z
Feeder Name	TUBA

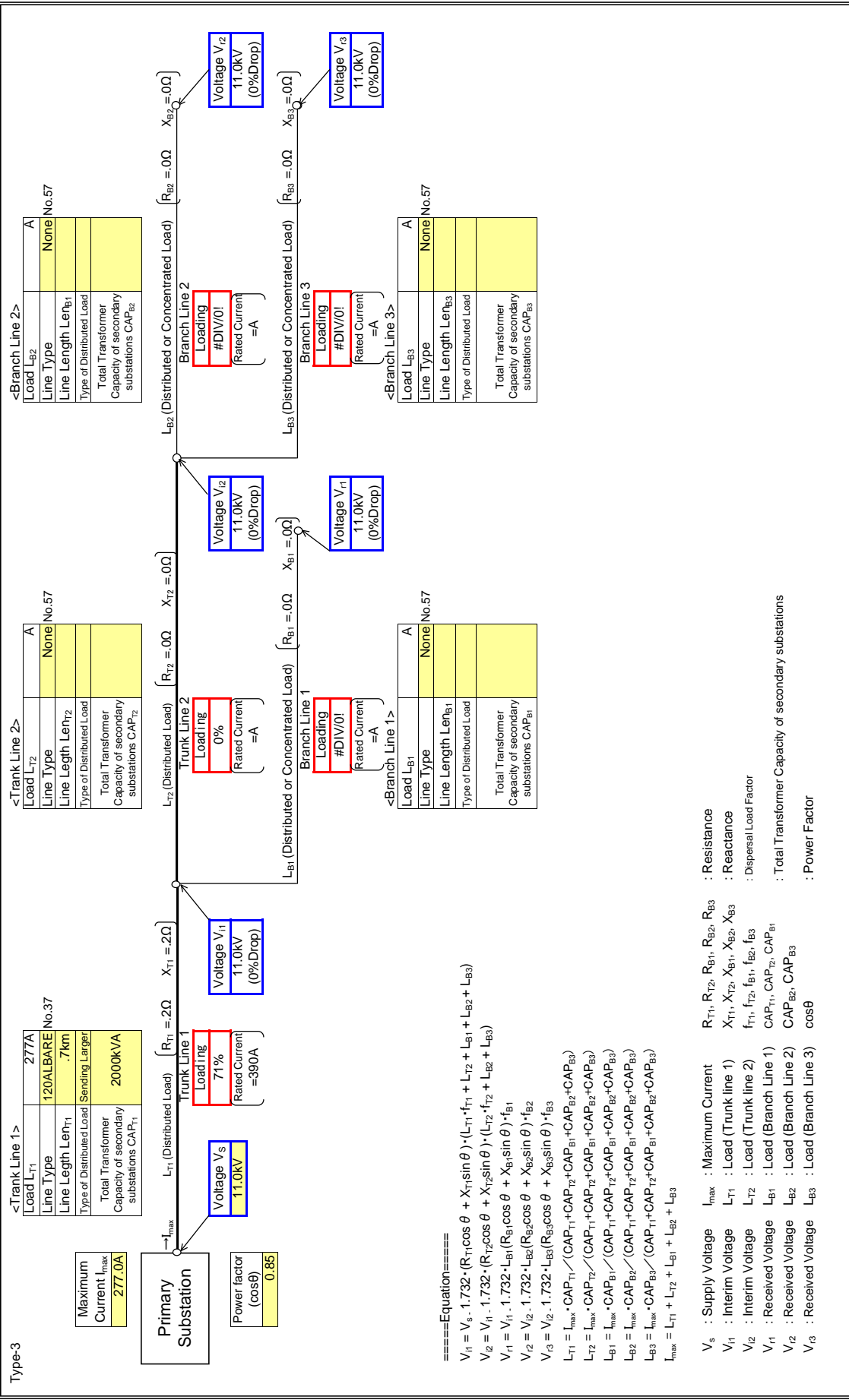
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

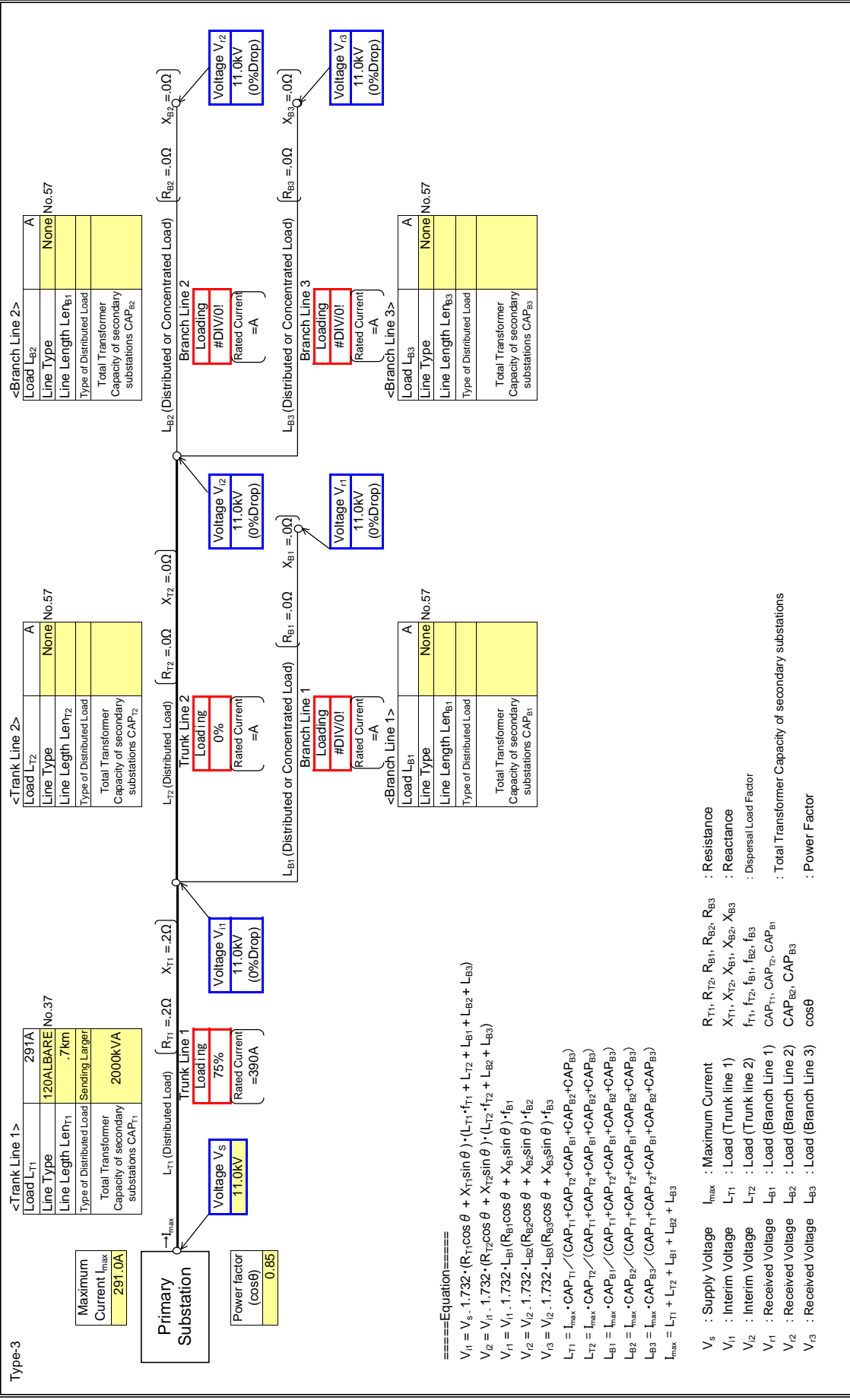
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

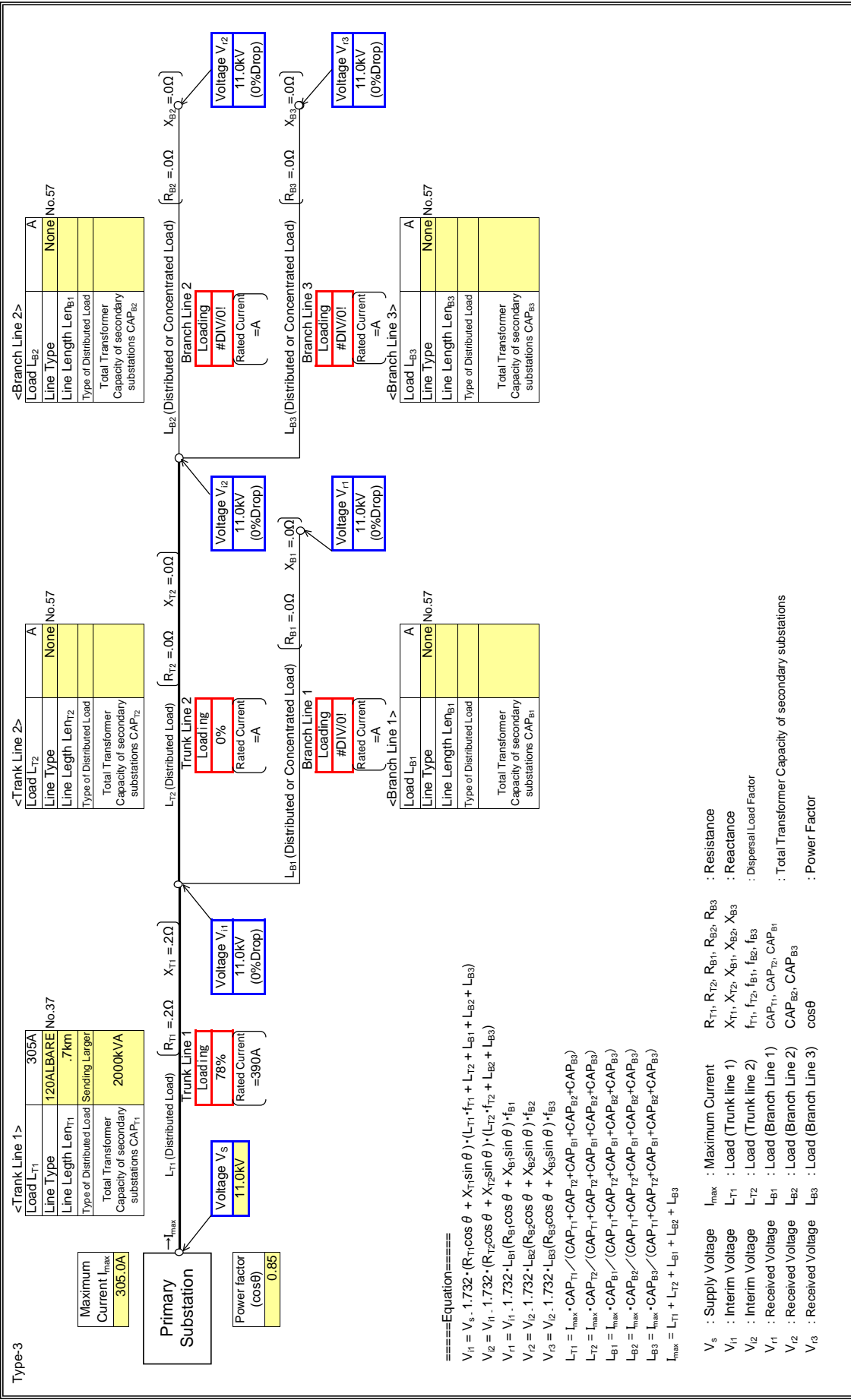
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

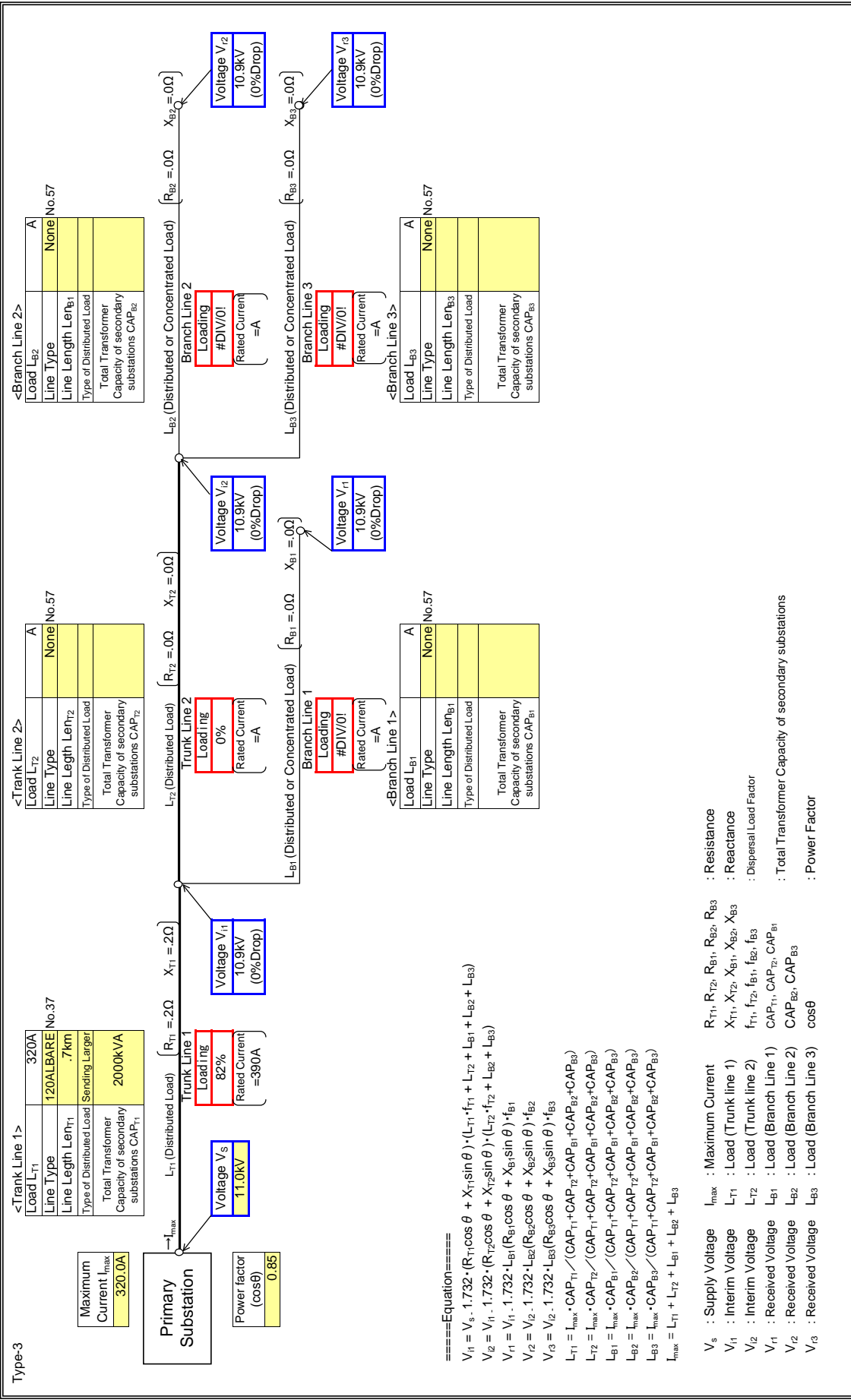
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

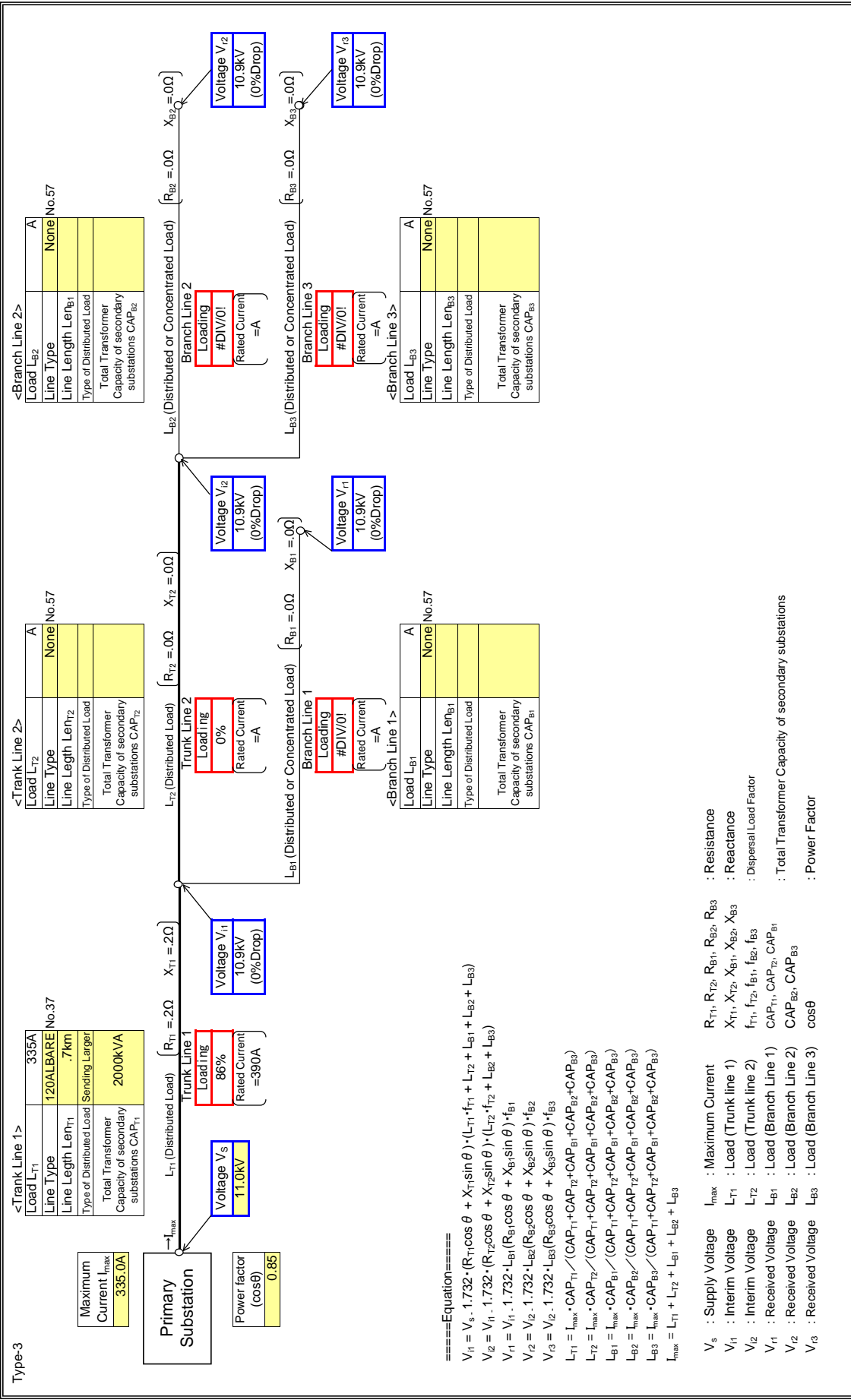
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

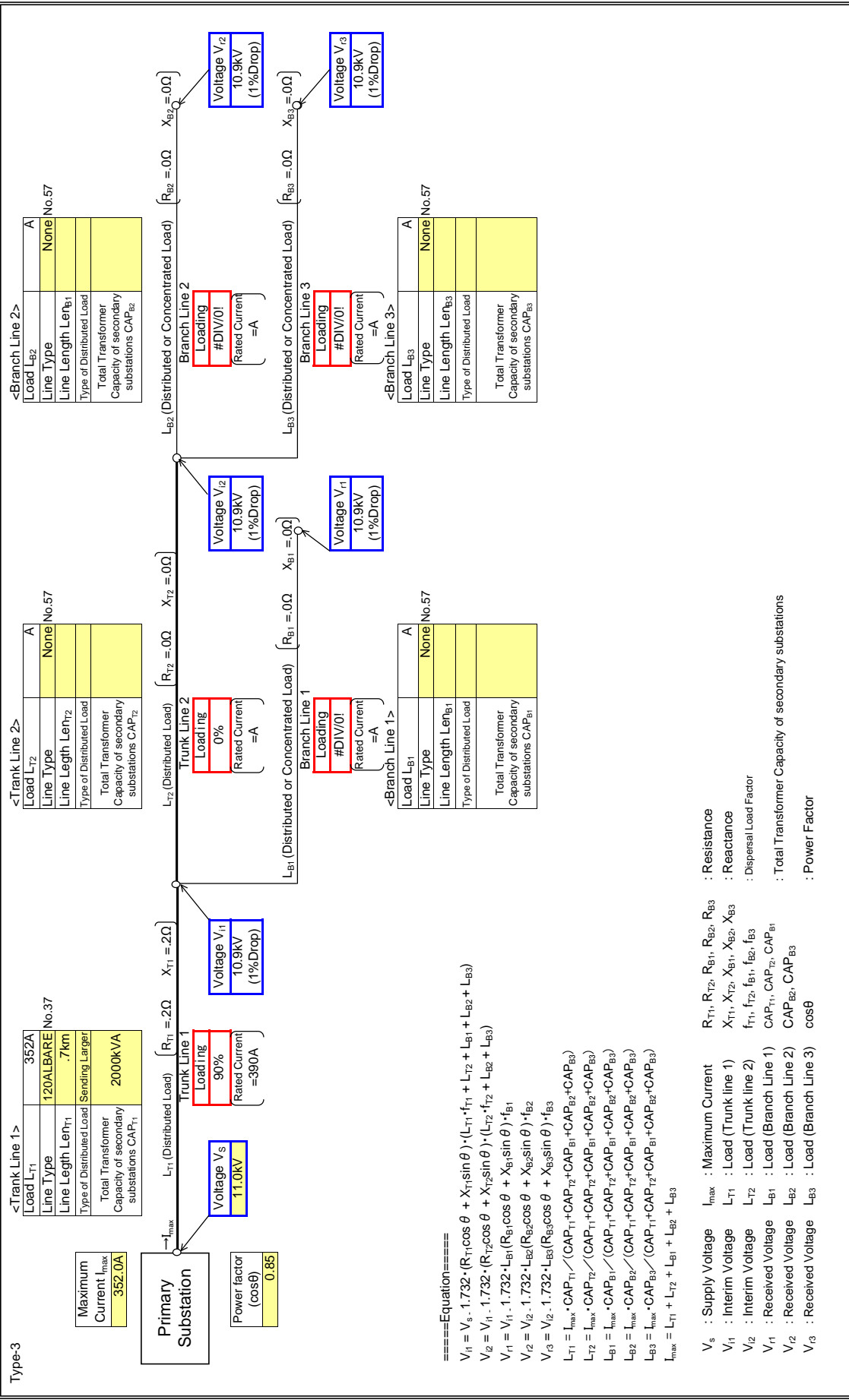
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

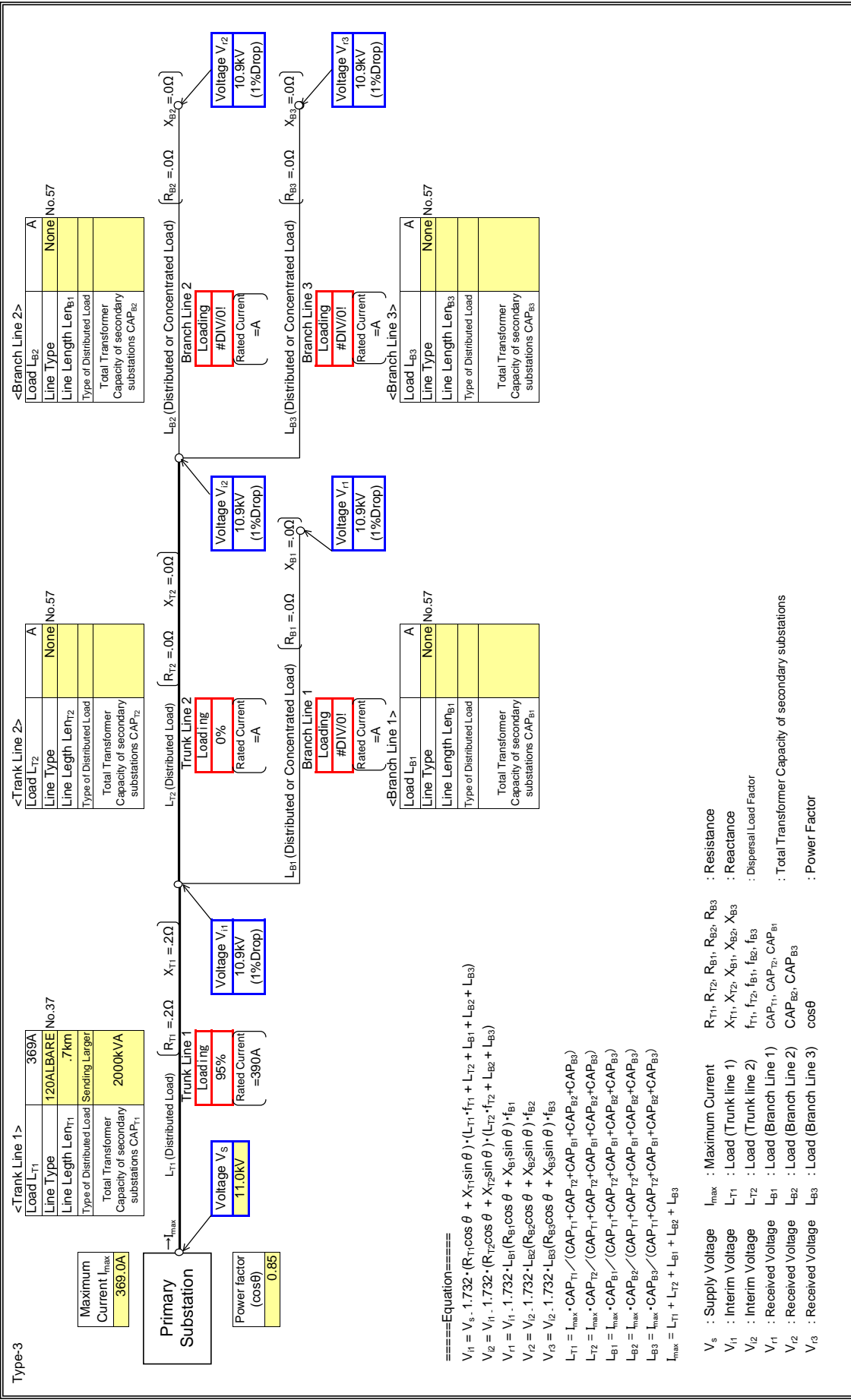
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

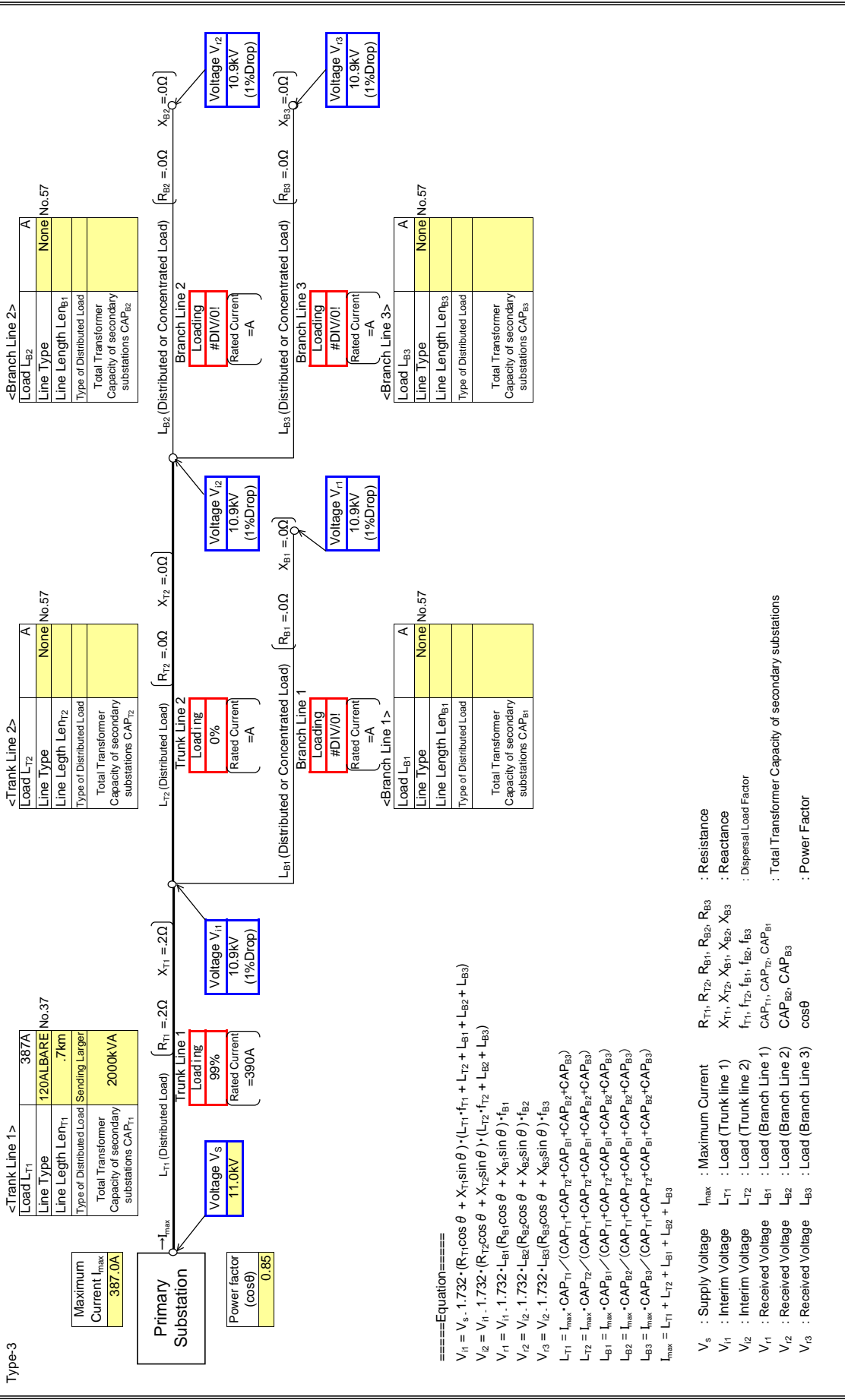
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

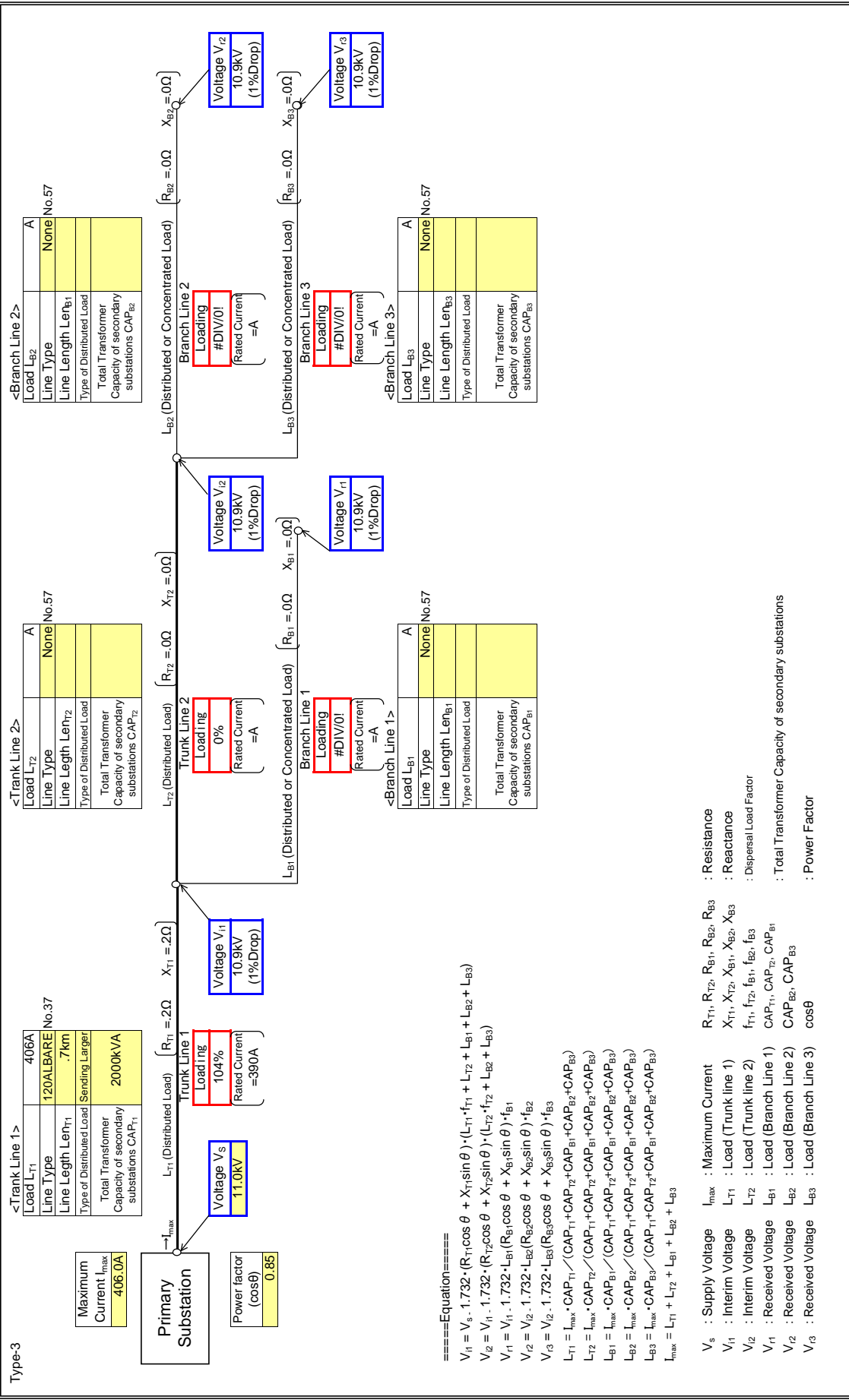
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

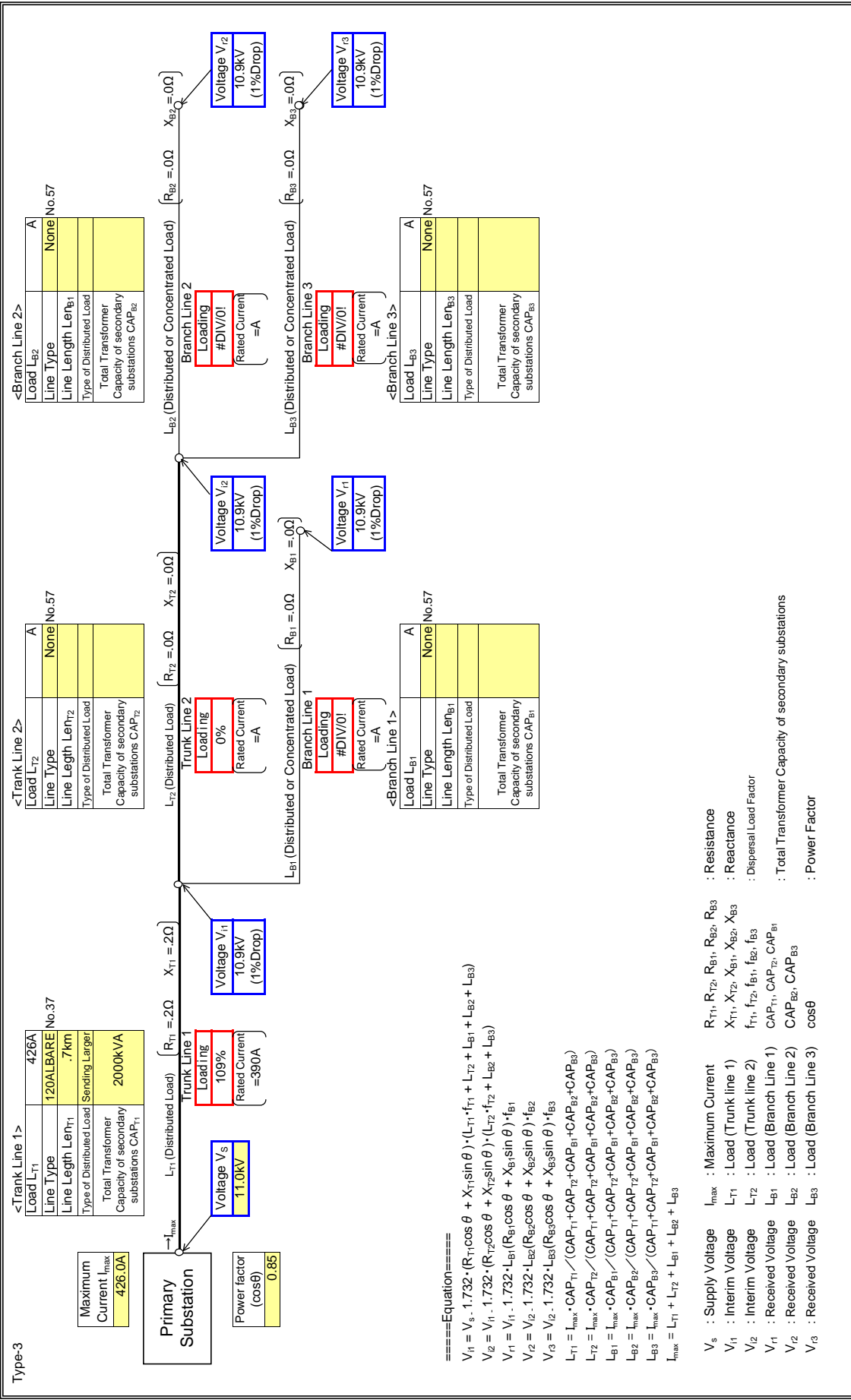
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

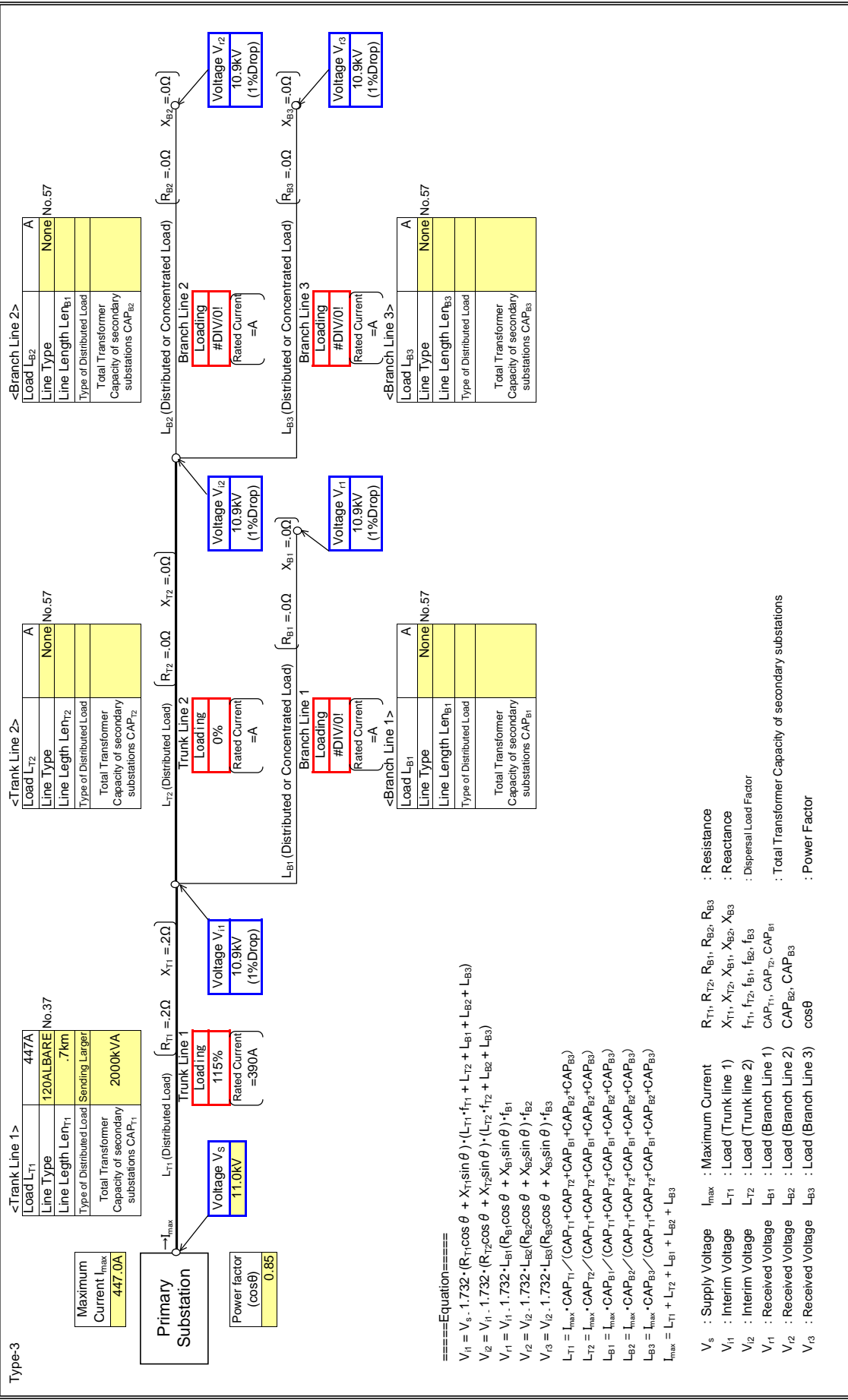
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

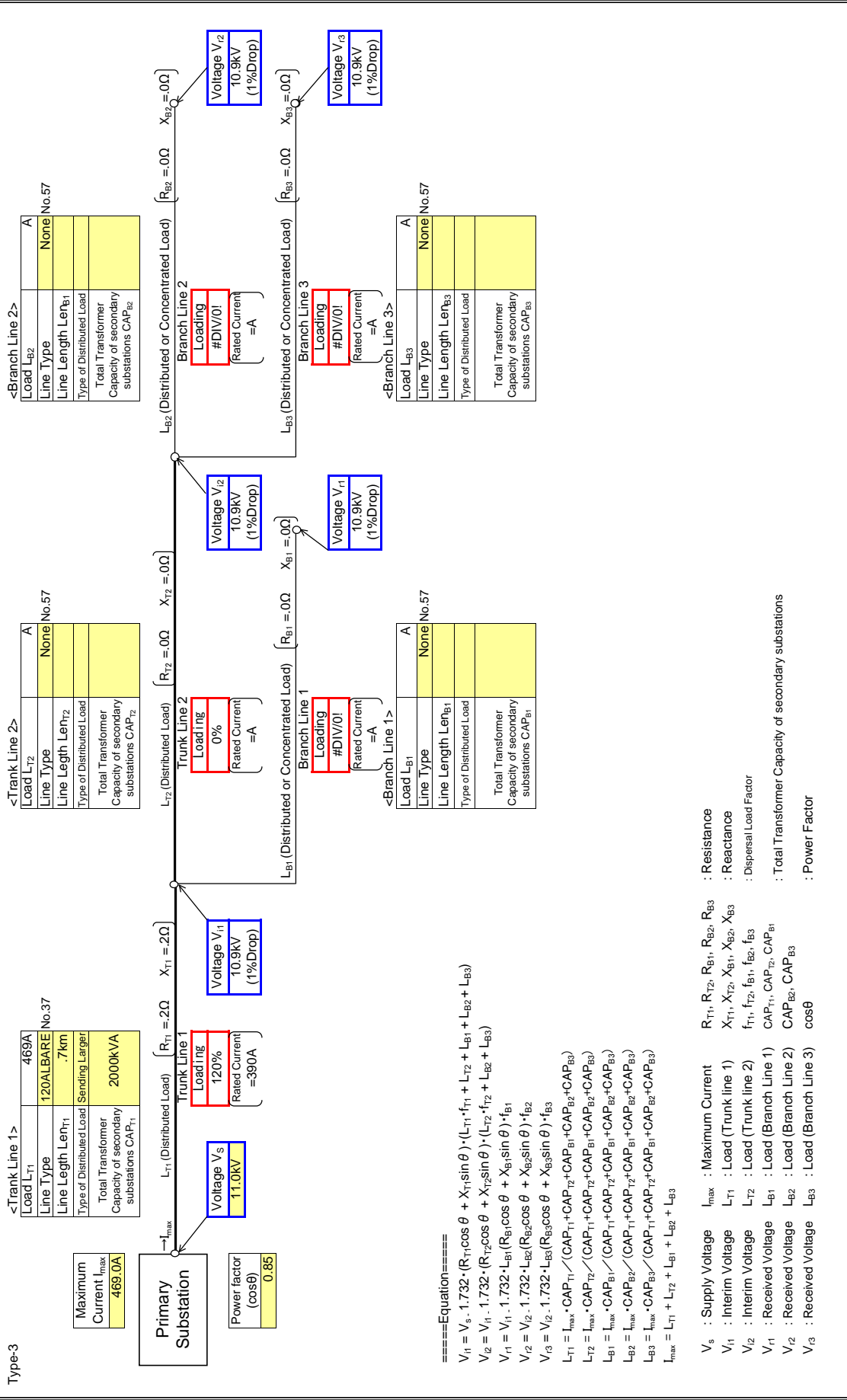
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V02

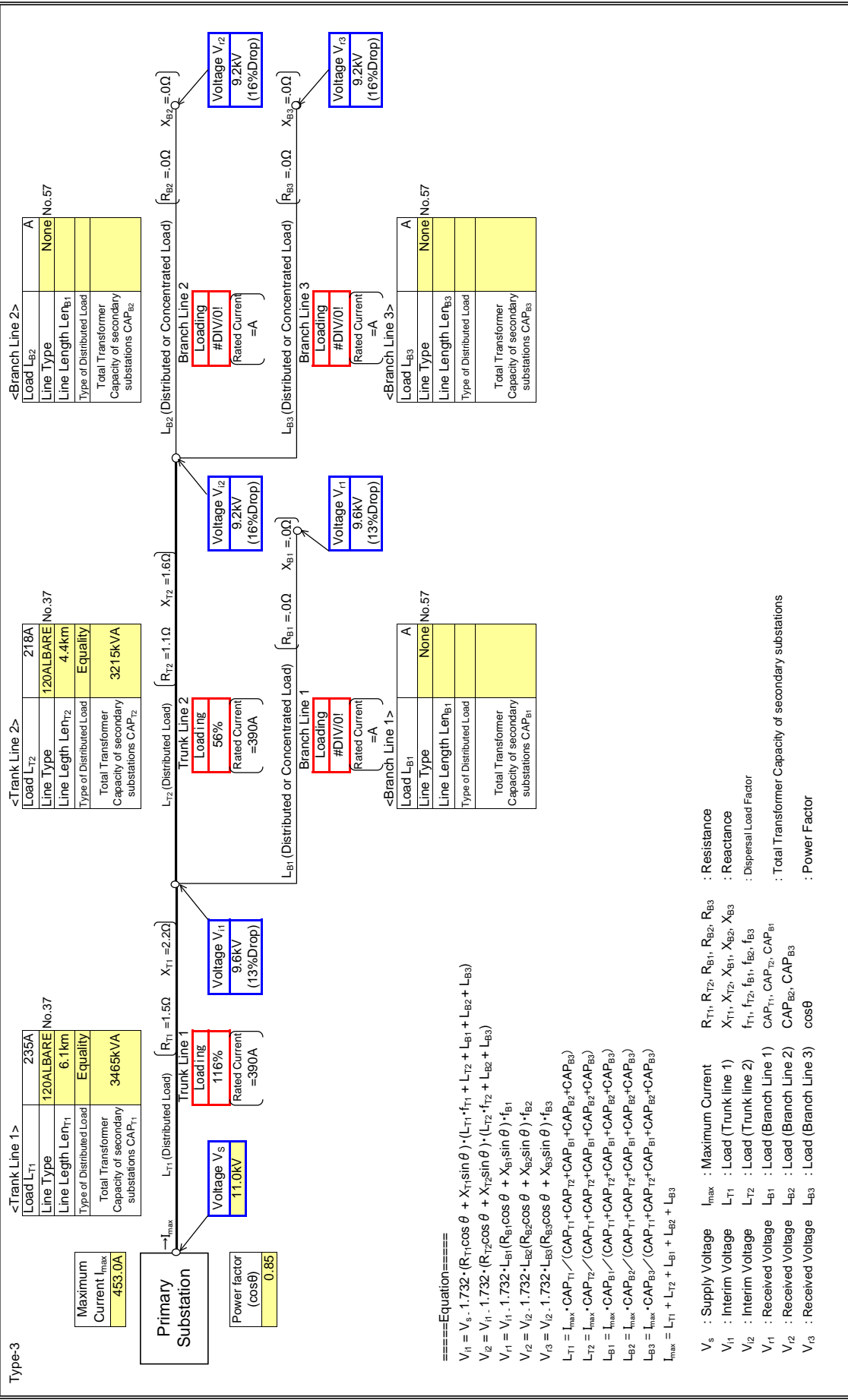
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

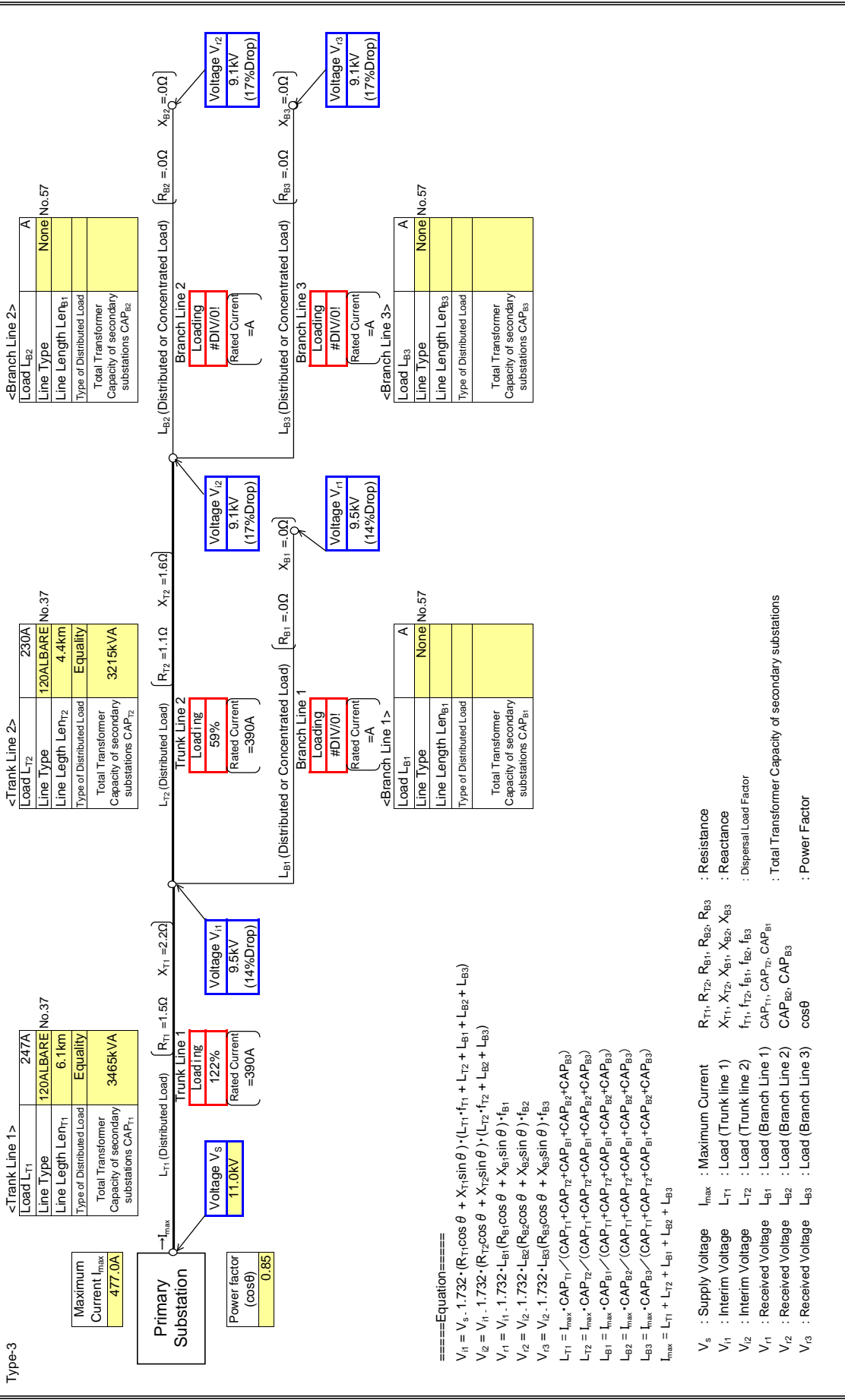
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

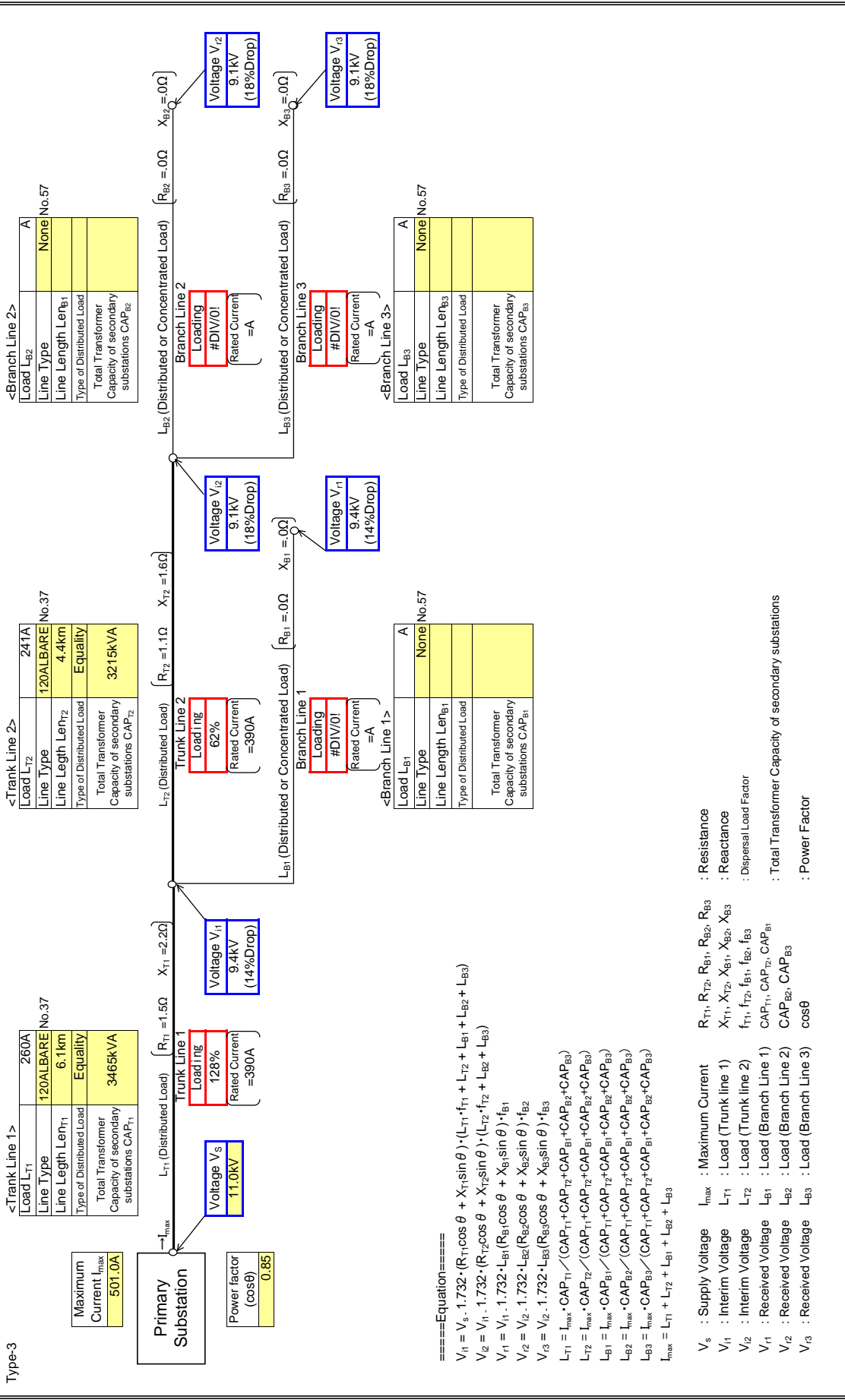
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

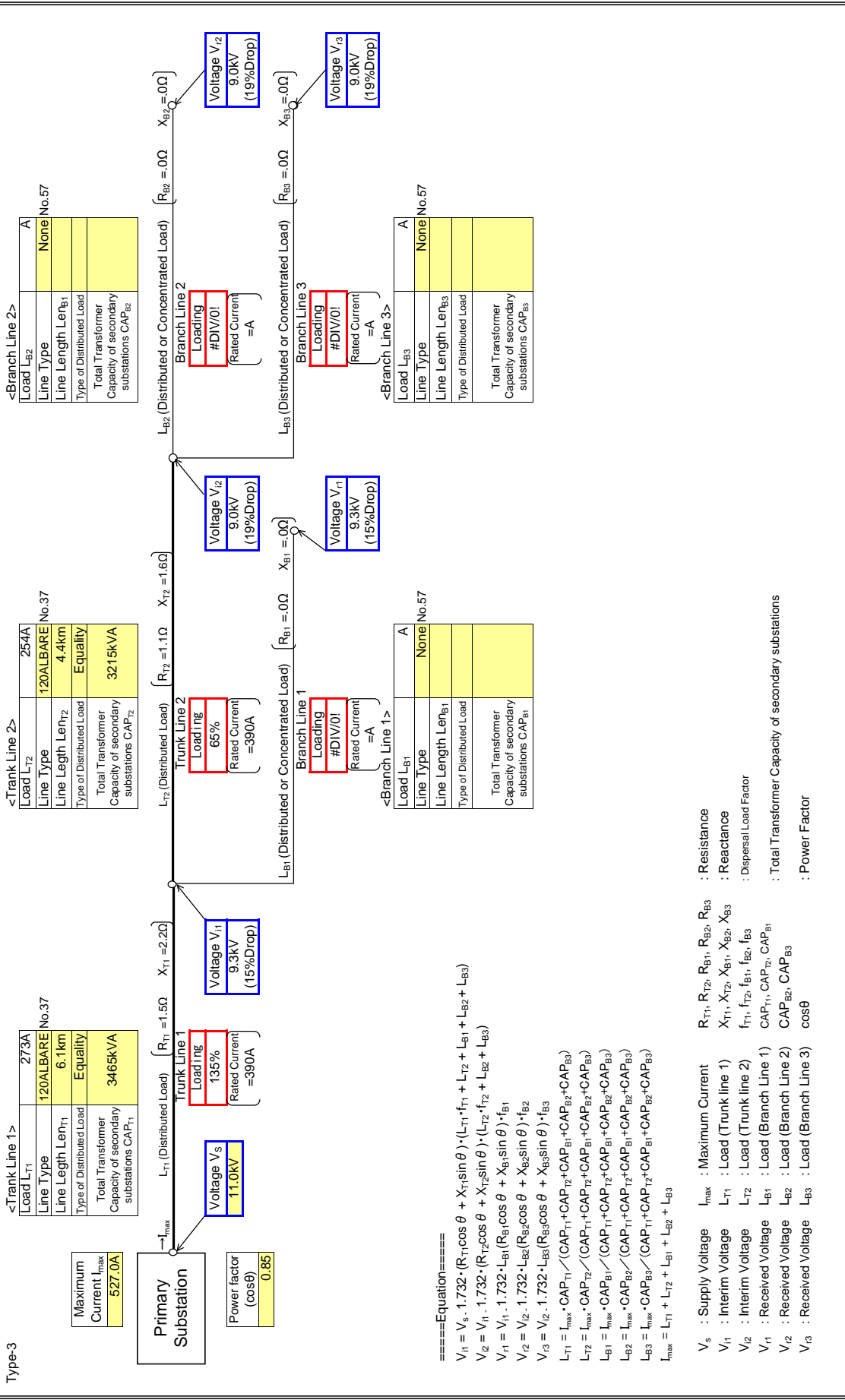
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

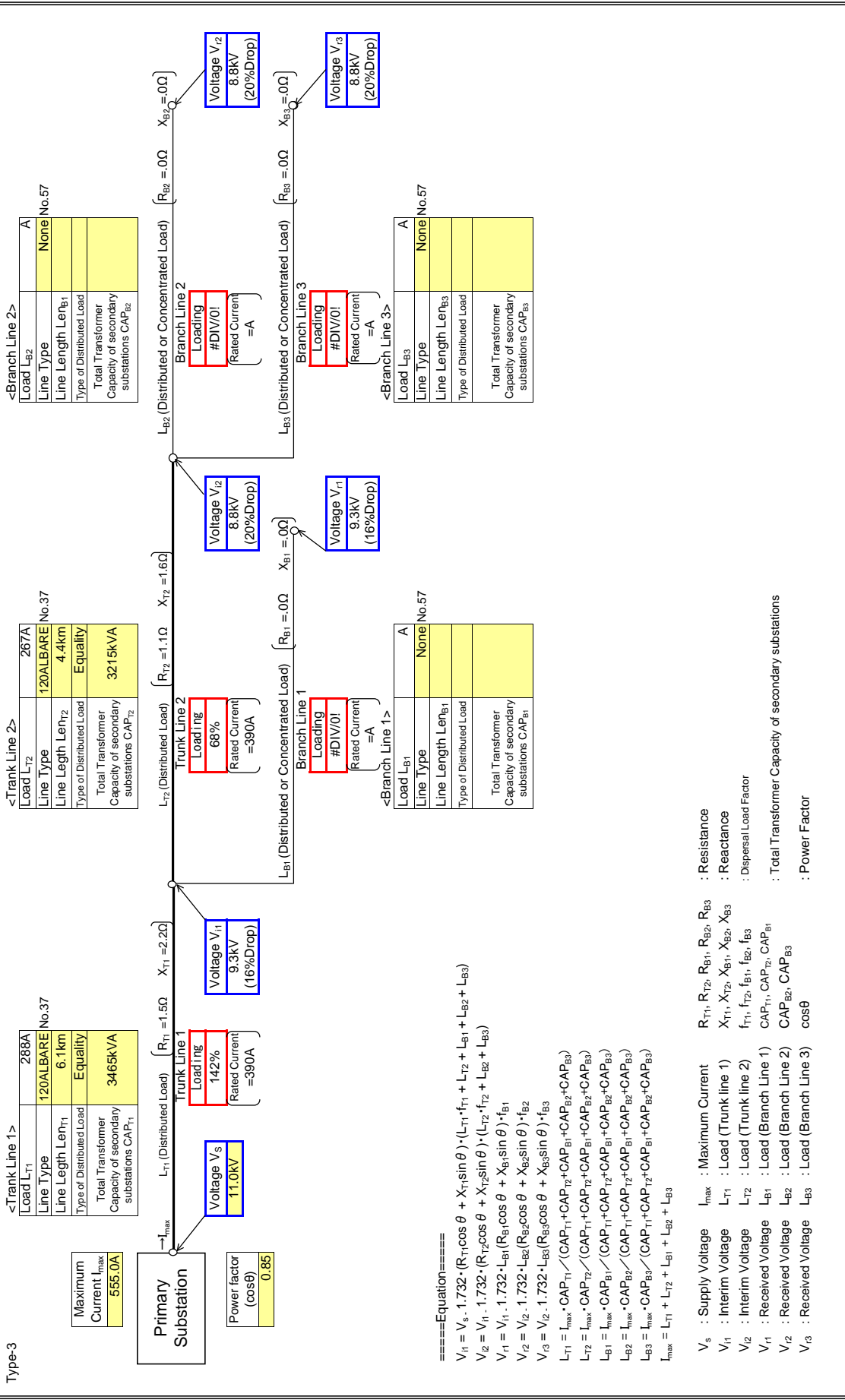
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

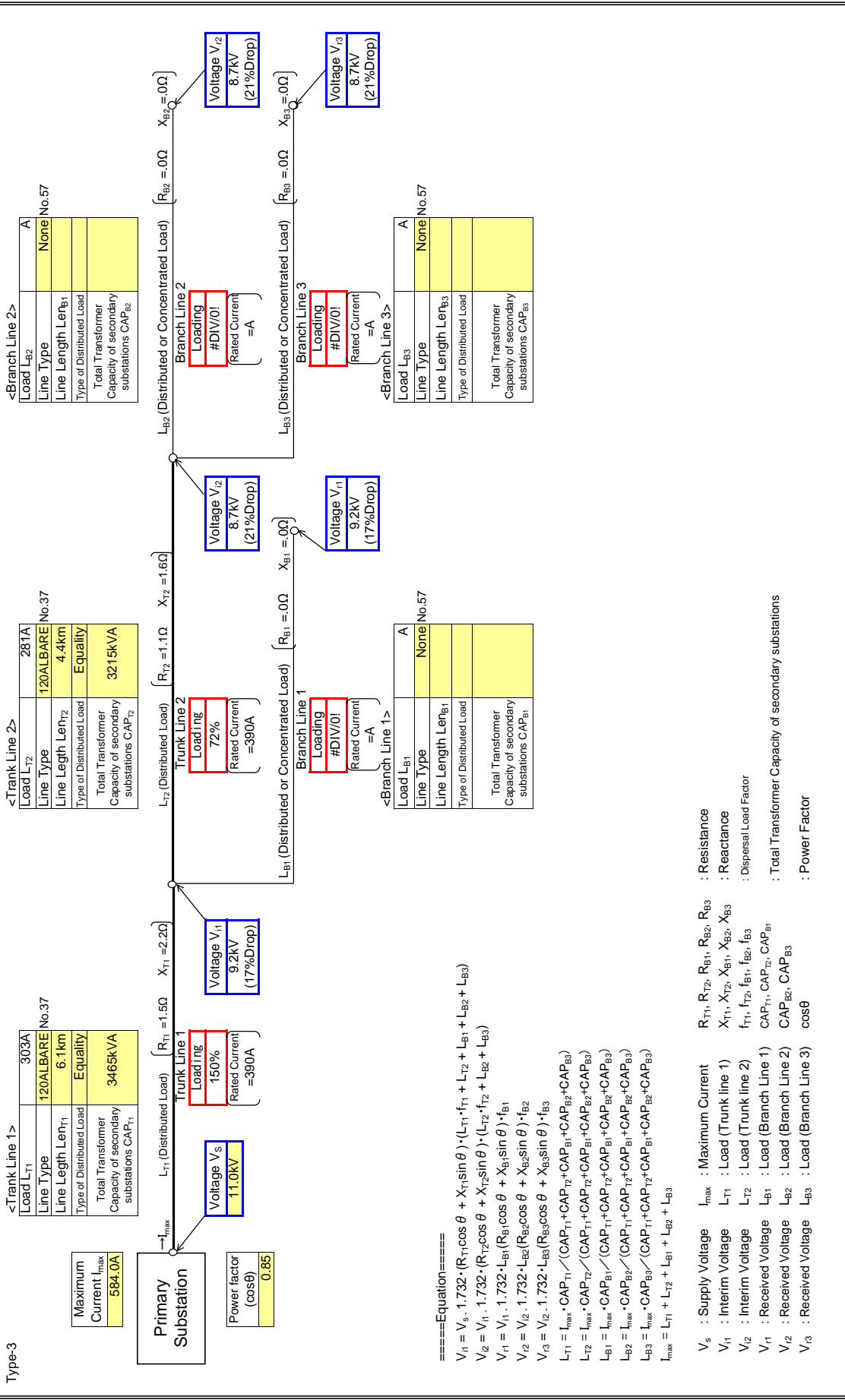
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

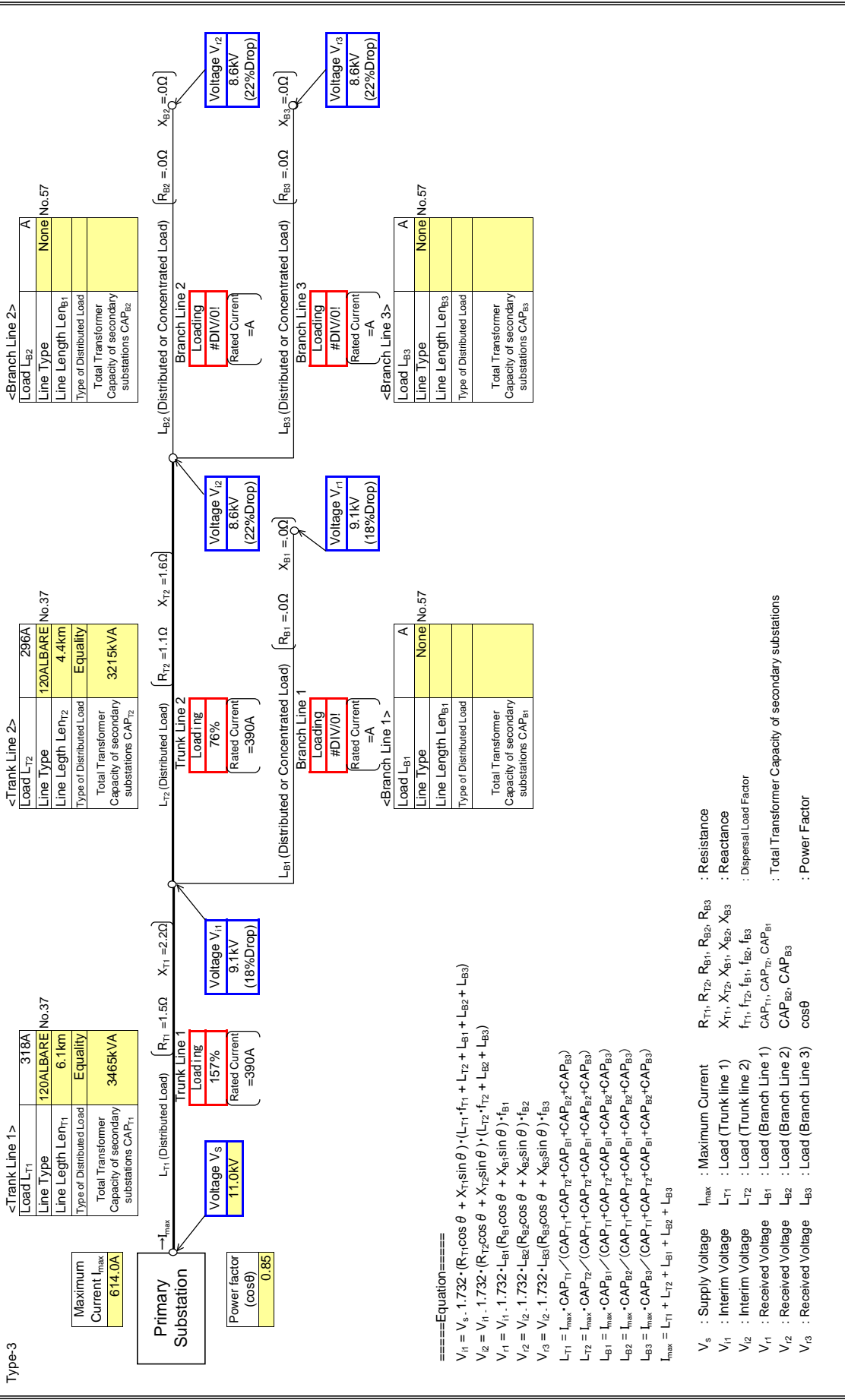
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

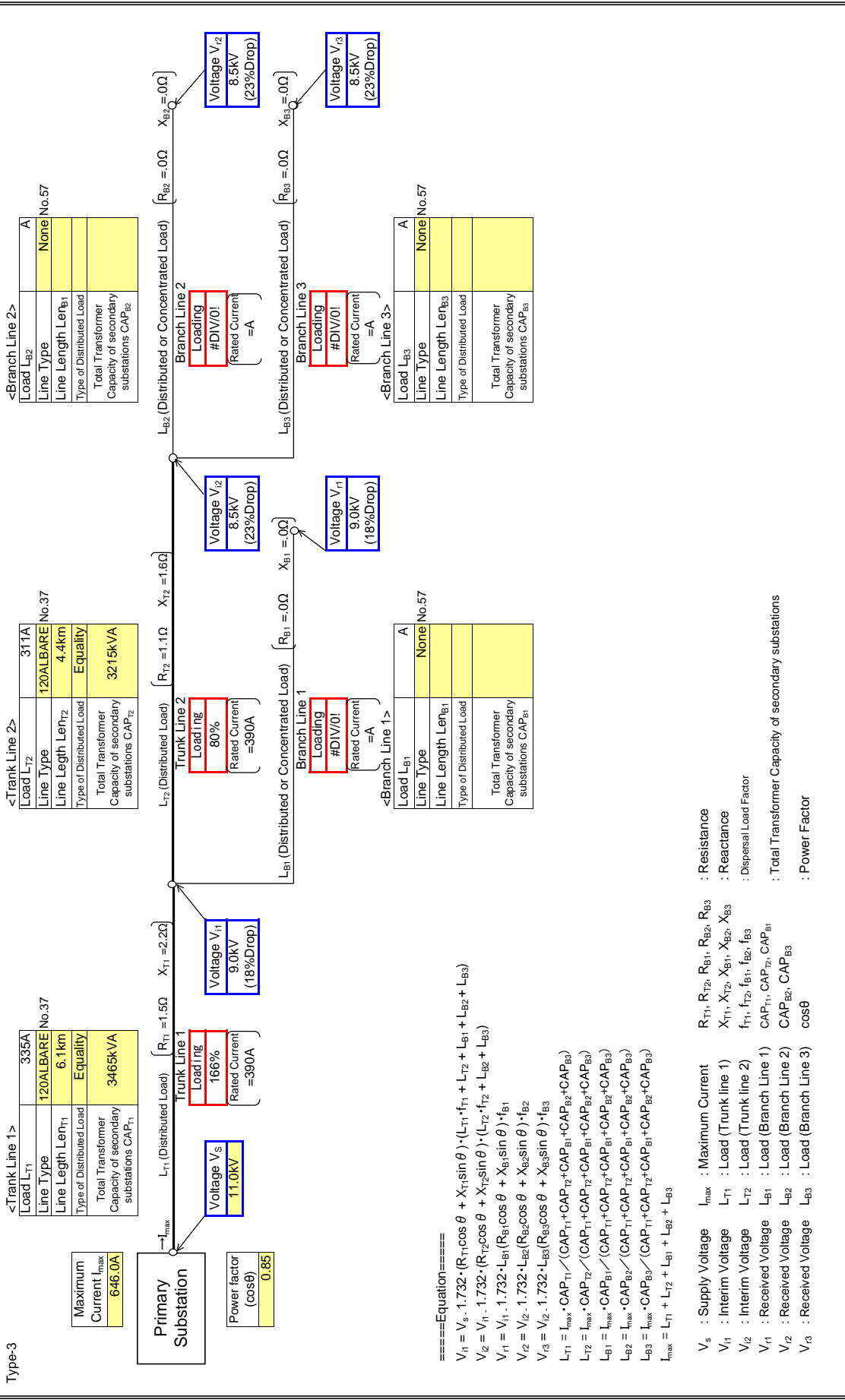
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

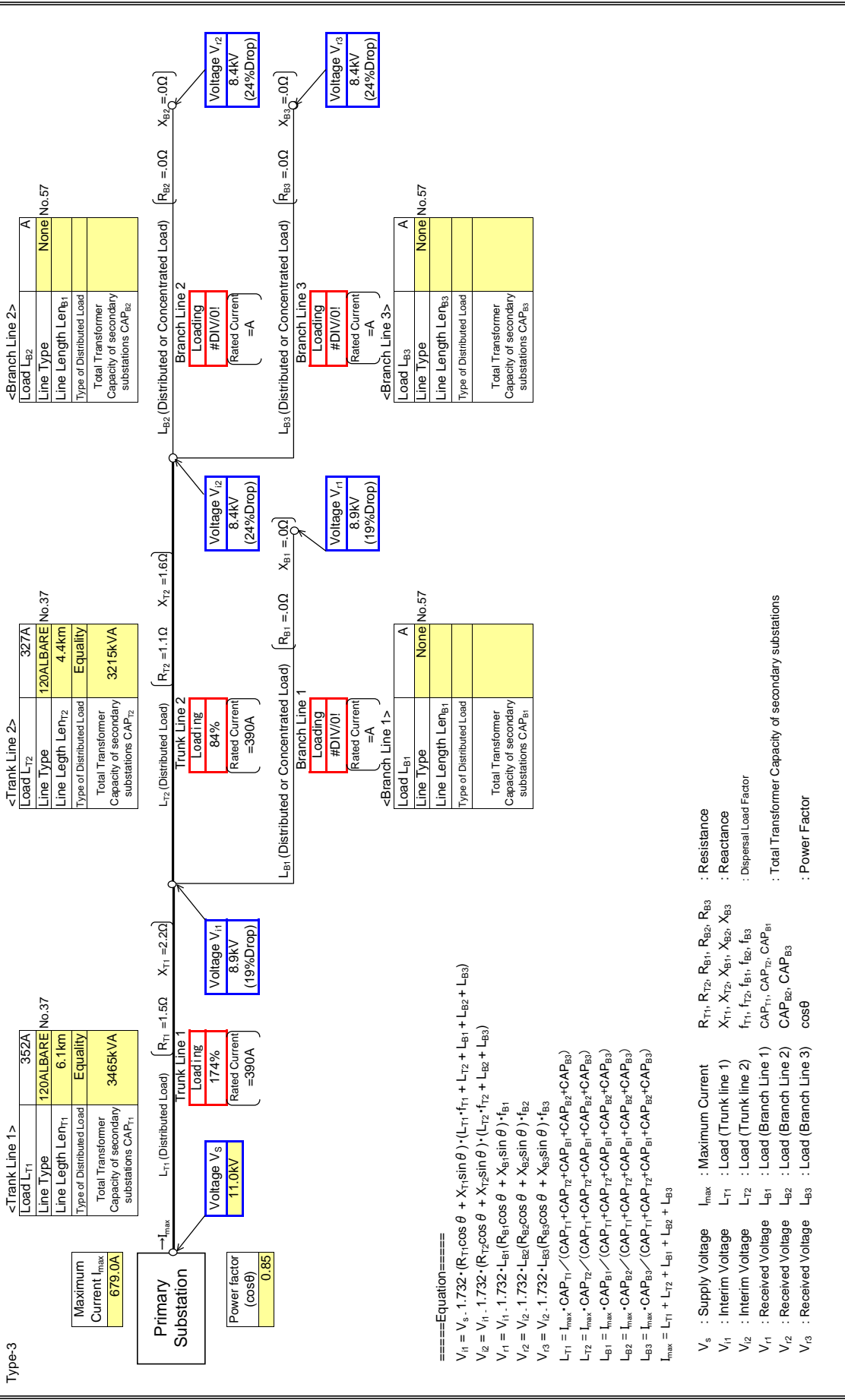
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

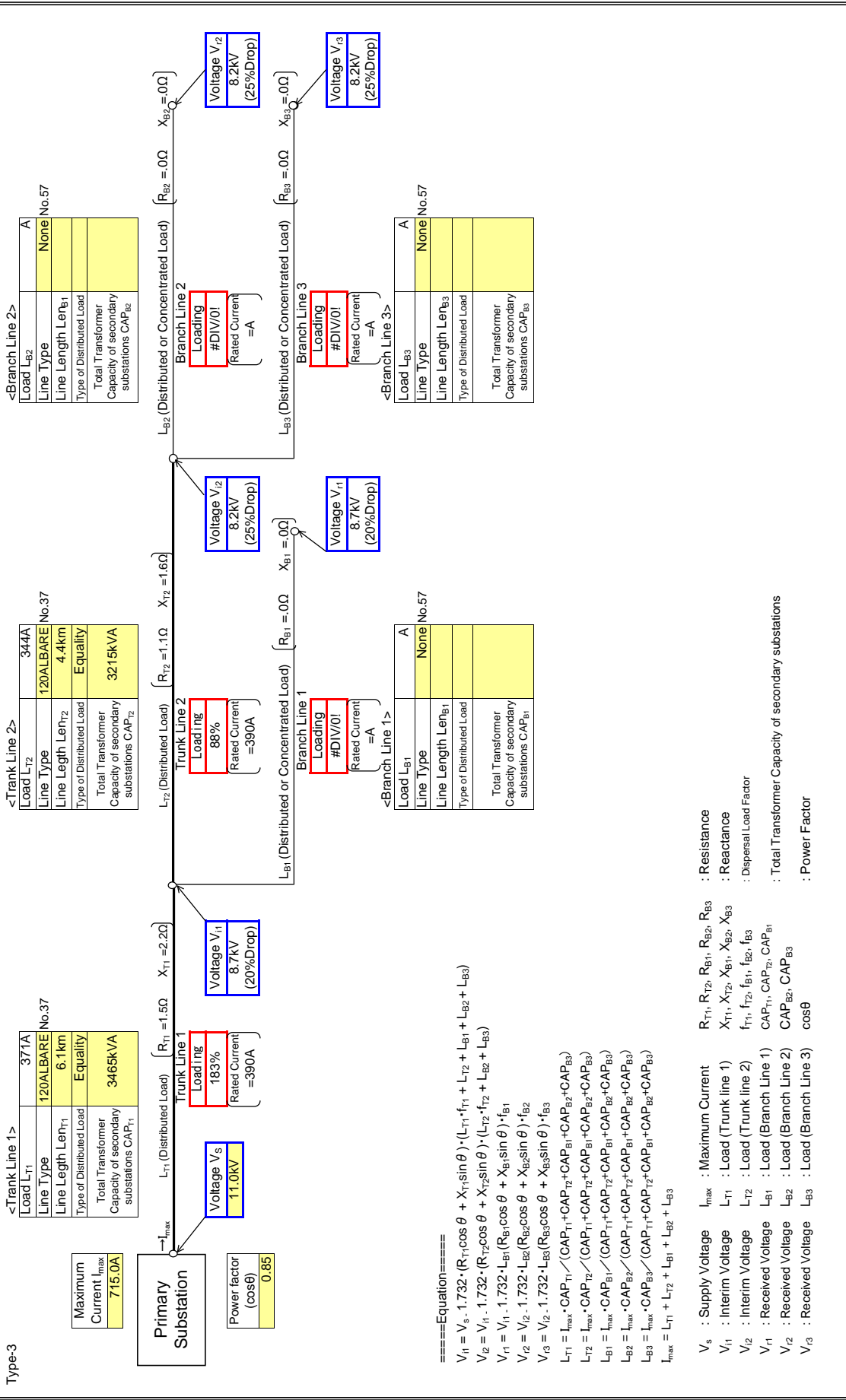
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

Input data in colored cells



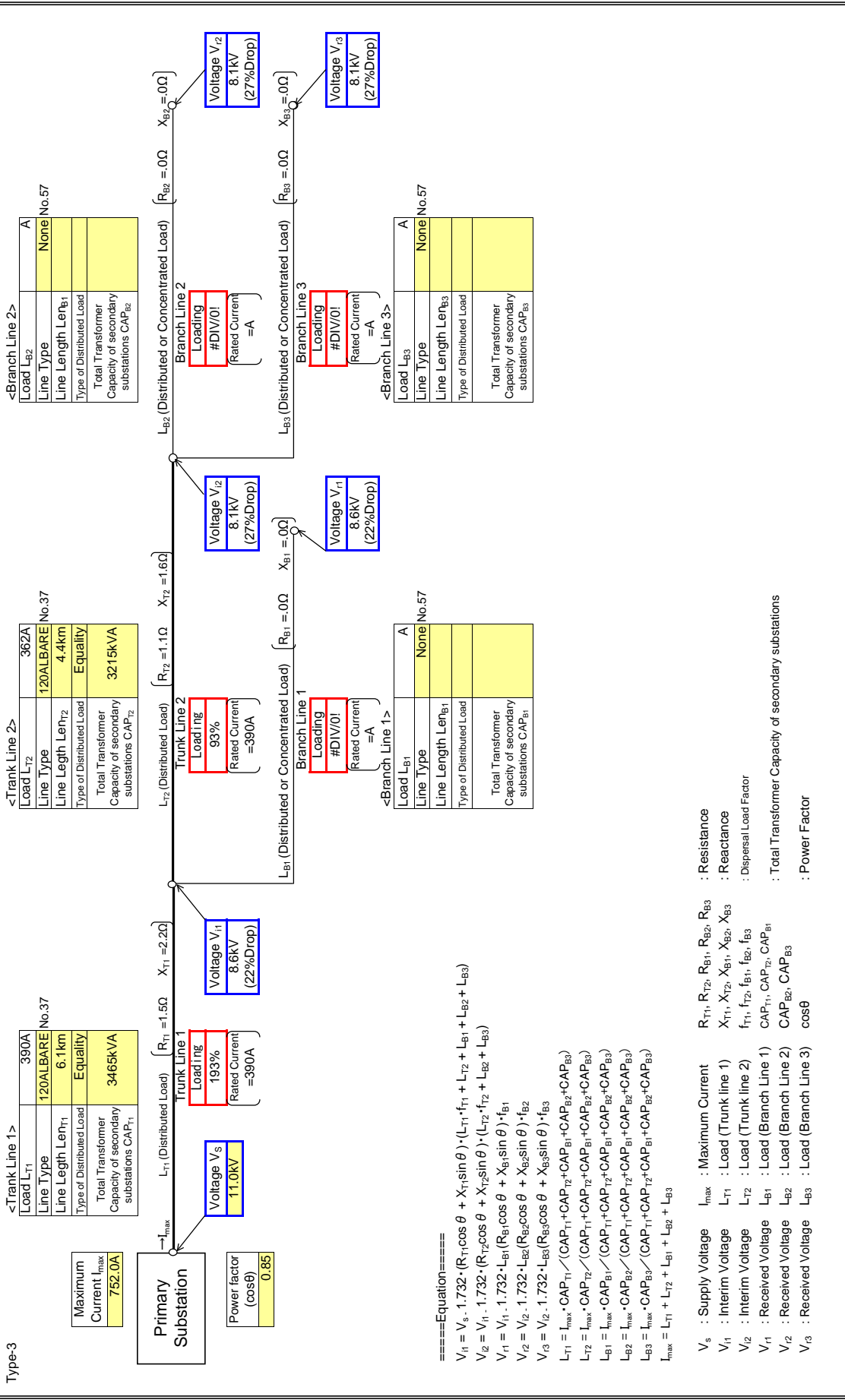
====Equation====
 $V_{r1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$
 $V_{r2} = V_{r1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$
 $V_{r3} = V_{r2} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- L_{T1}, L_{T2} : Load (Trunk line 1)
- L_{B1}, L_{B2}, L_{B3} : Load (Branch Line 1)
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations
- CAP_{B2}, CAP_{B3} : Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

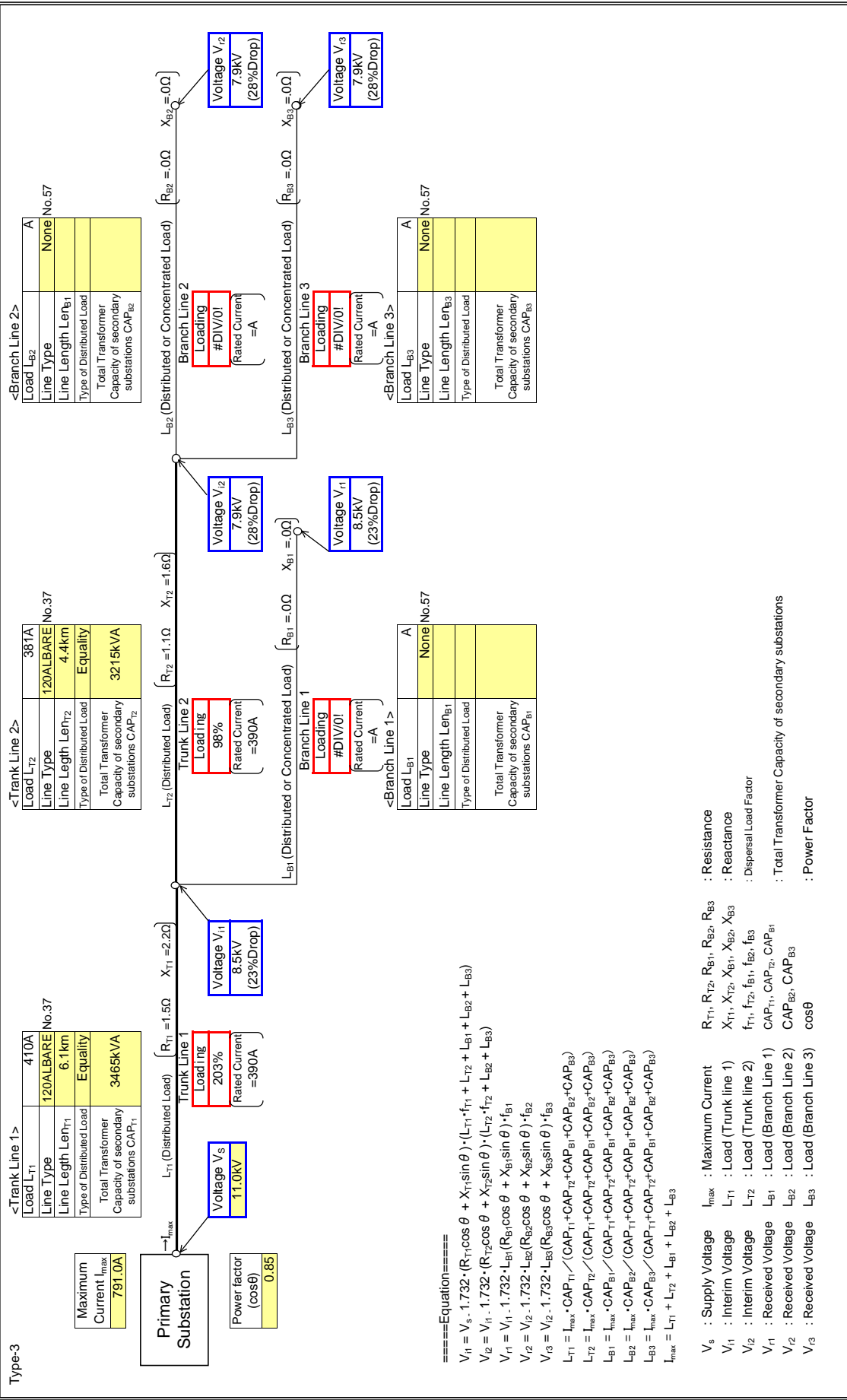
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION V
Feeder Name	V10

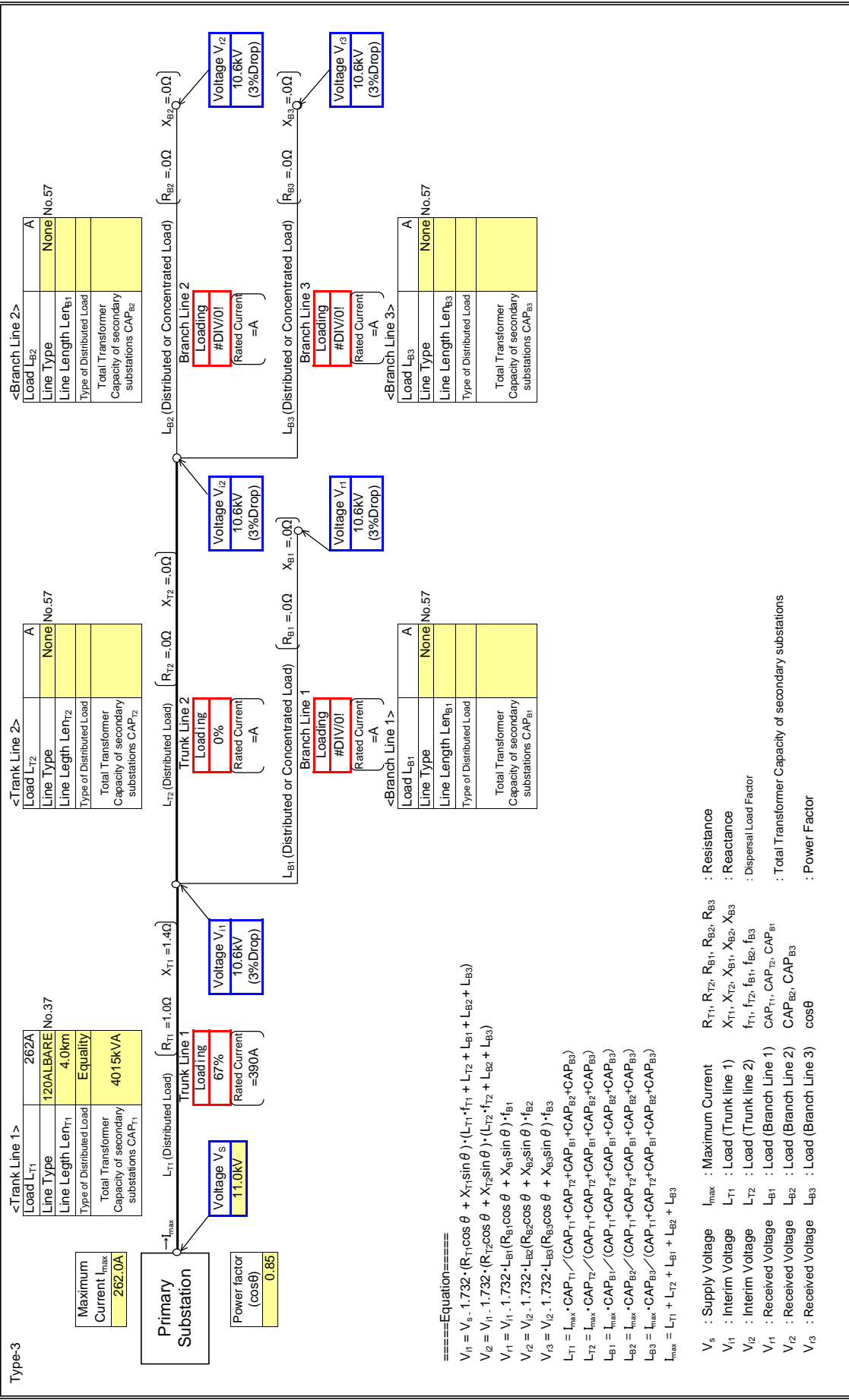
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

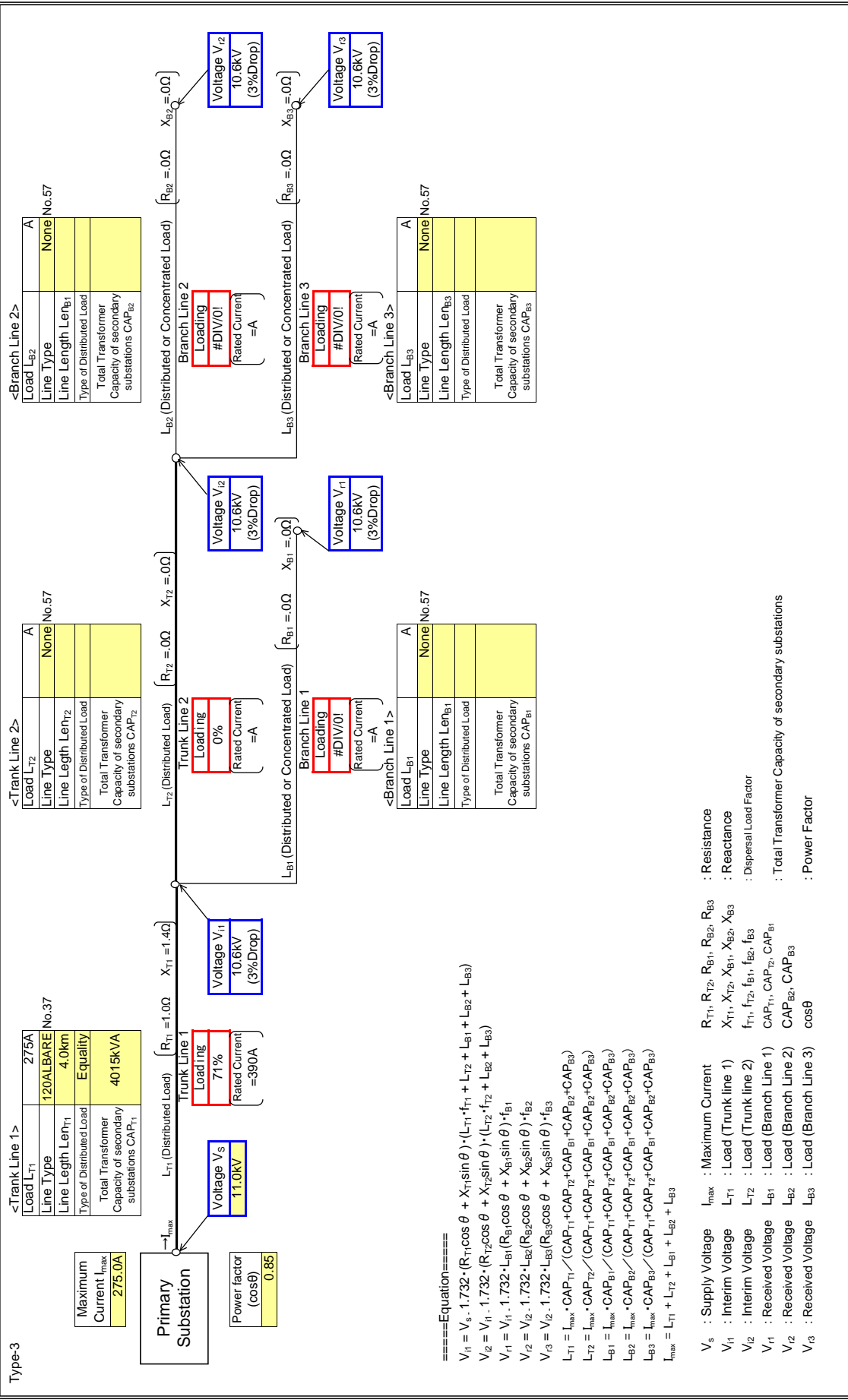
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

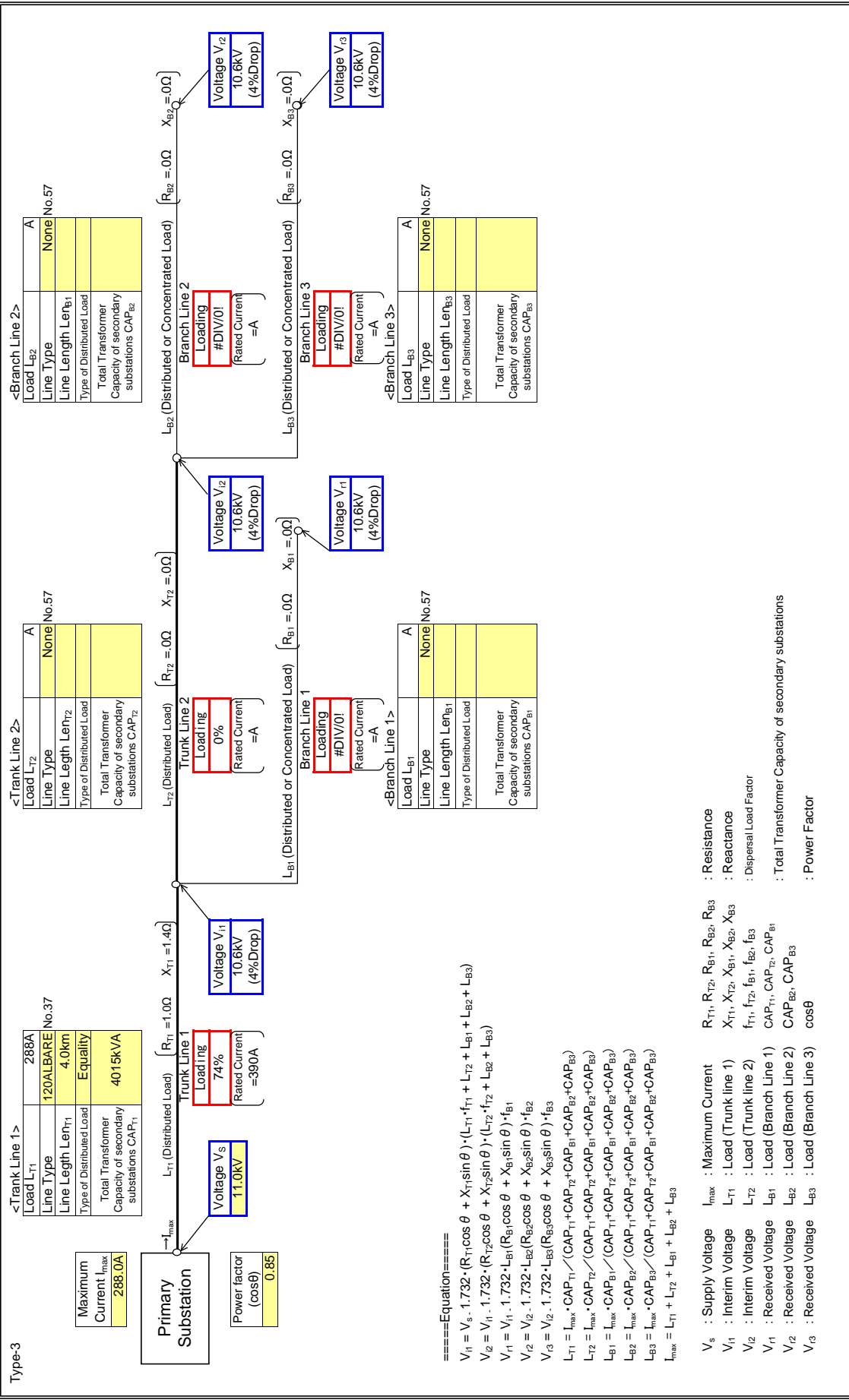
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

Input data in colored cells



====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{r1} = V_{i1} \cdot 1.732 \cdot L_{B1} (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{i2} = V_{i2} \cdot 1.732 \cdot L_{B2} (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{r3} = V_{i2} \cdot 1.732 \cdot L_{B3} (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

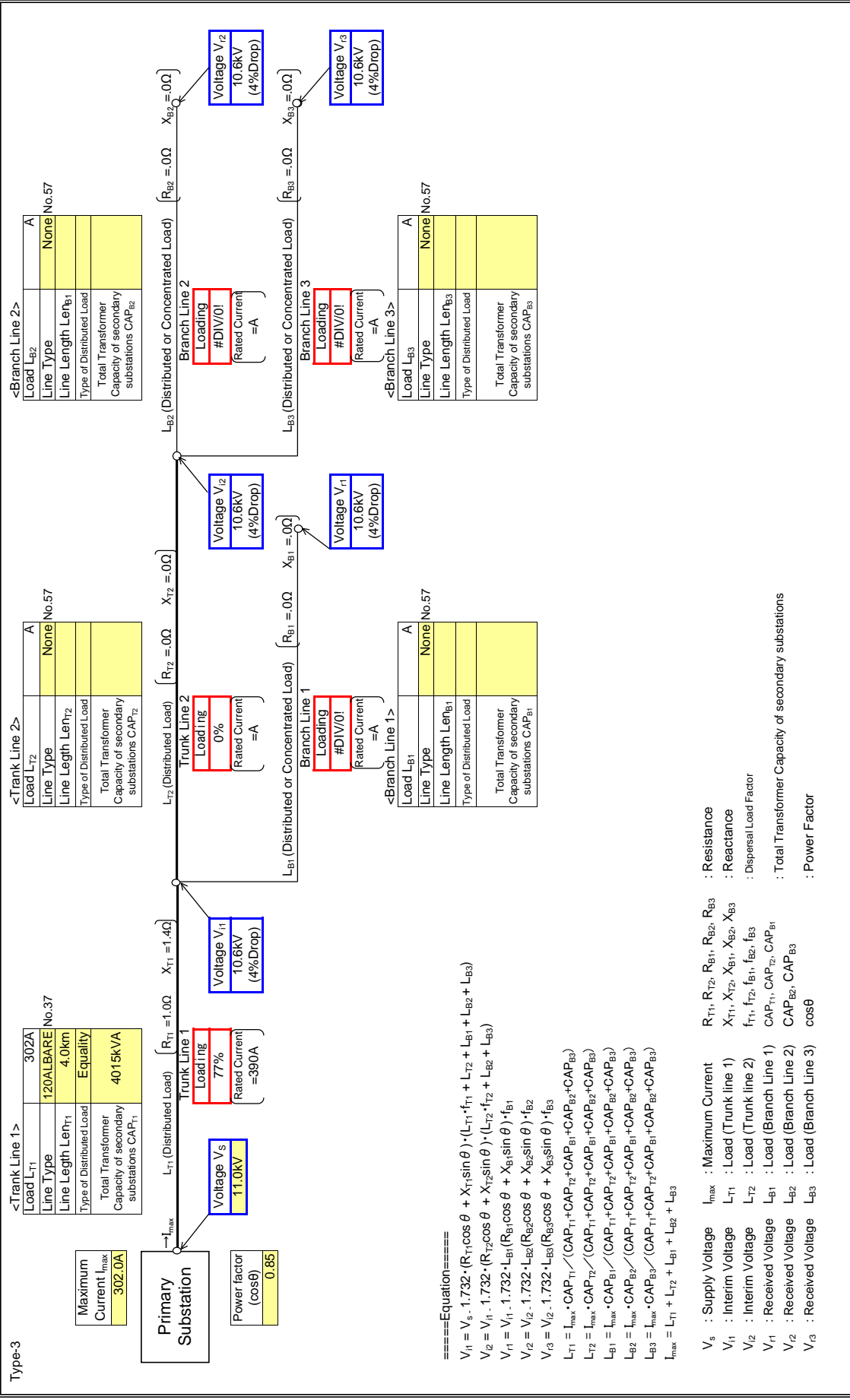
$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

- V_s : Supply Voltage
- I_{max} : Maximum Current
- $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance
- $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance
- L_{T1}, L_{T2} : Load (Trunk line 1)
- L_{B1}, L_{B2}, L_{B3} : Load (Branch Line 1)
- $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor
- $CAP_{T1}, CAP_{T2}, CAP_{B1}, CAP_{B2}, CAP_{B3}$: Total Transformer Capacity of secondary substations
- $\cos \theta$: Power Factor

Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

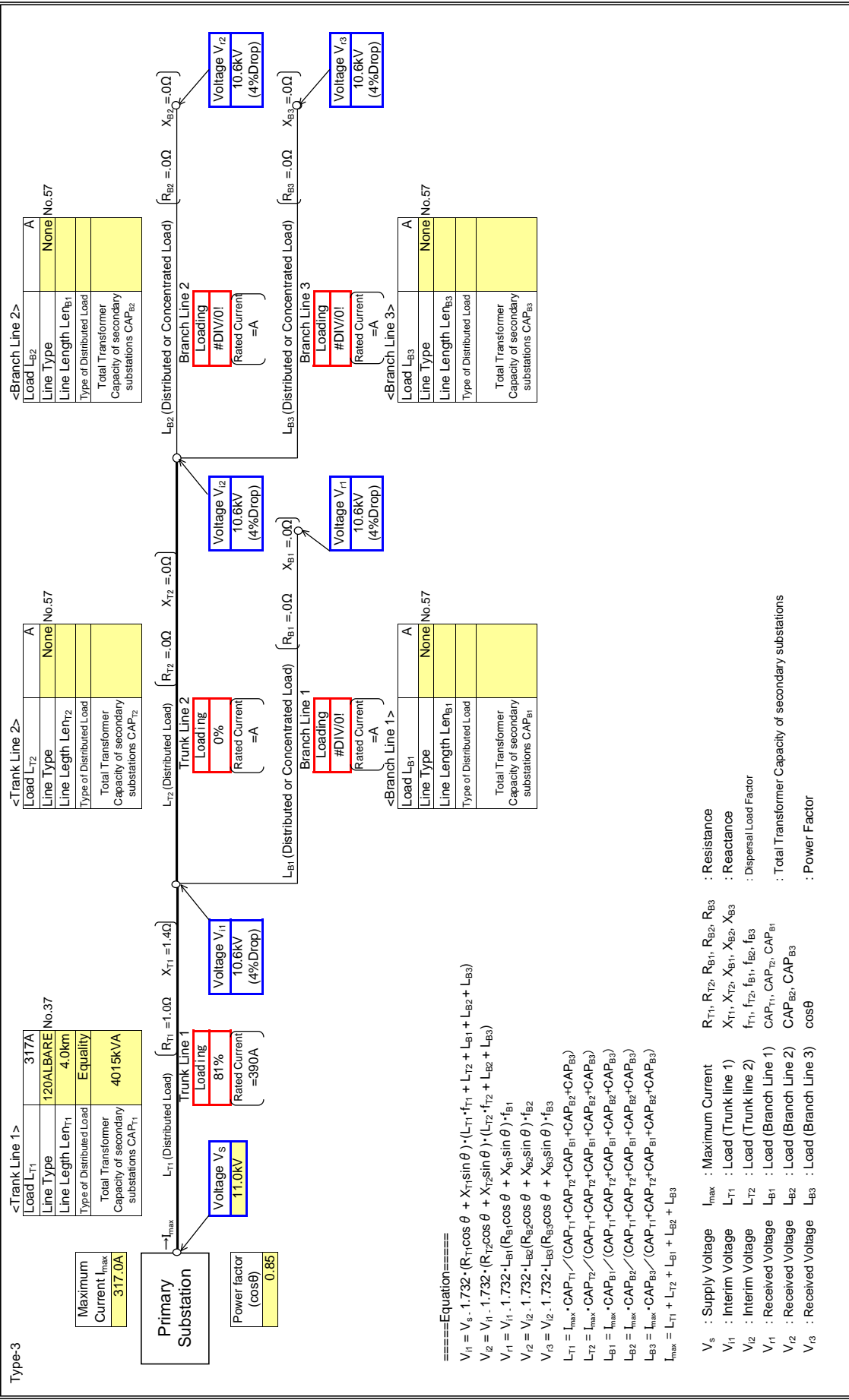
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

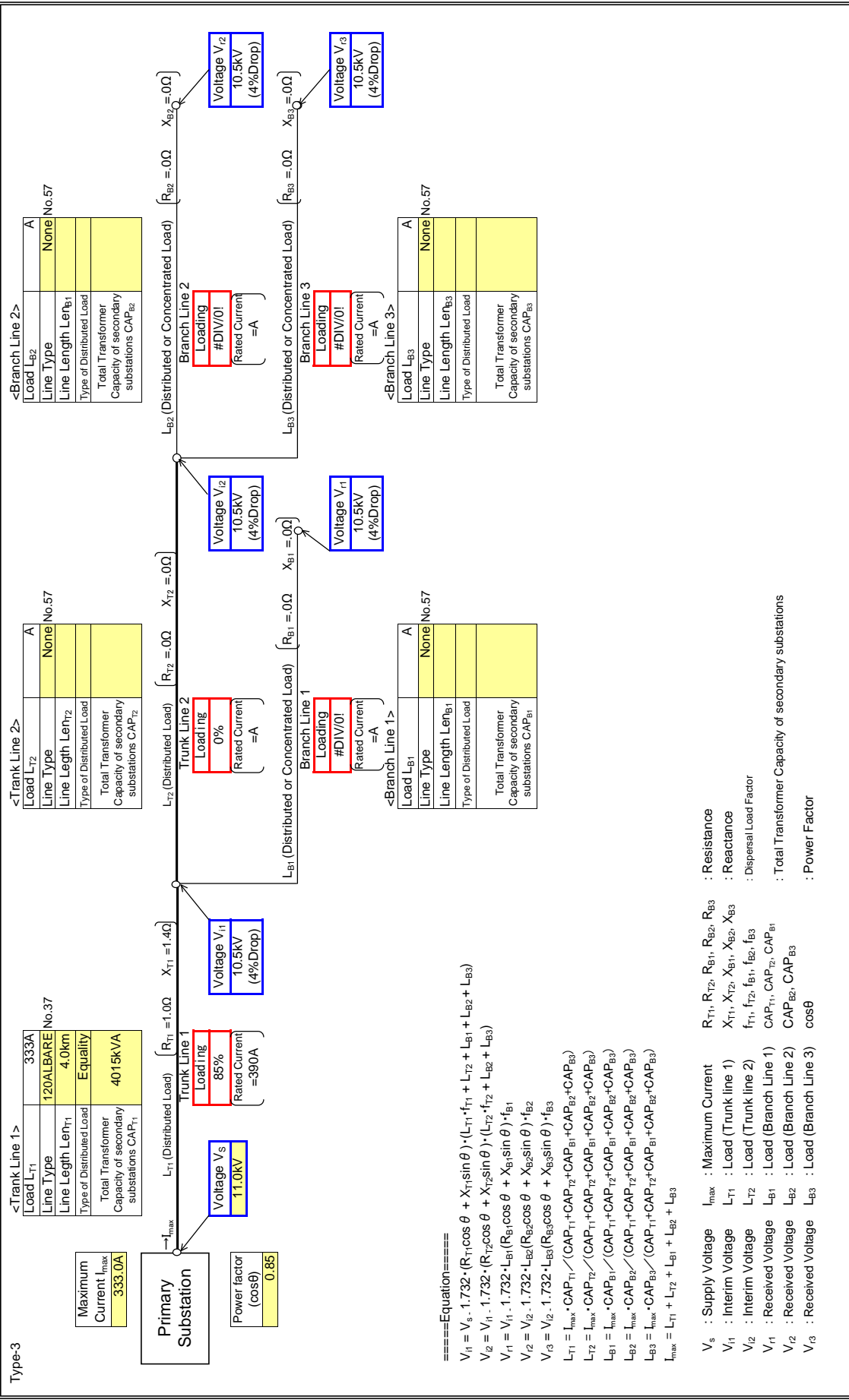
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

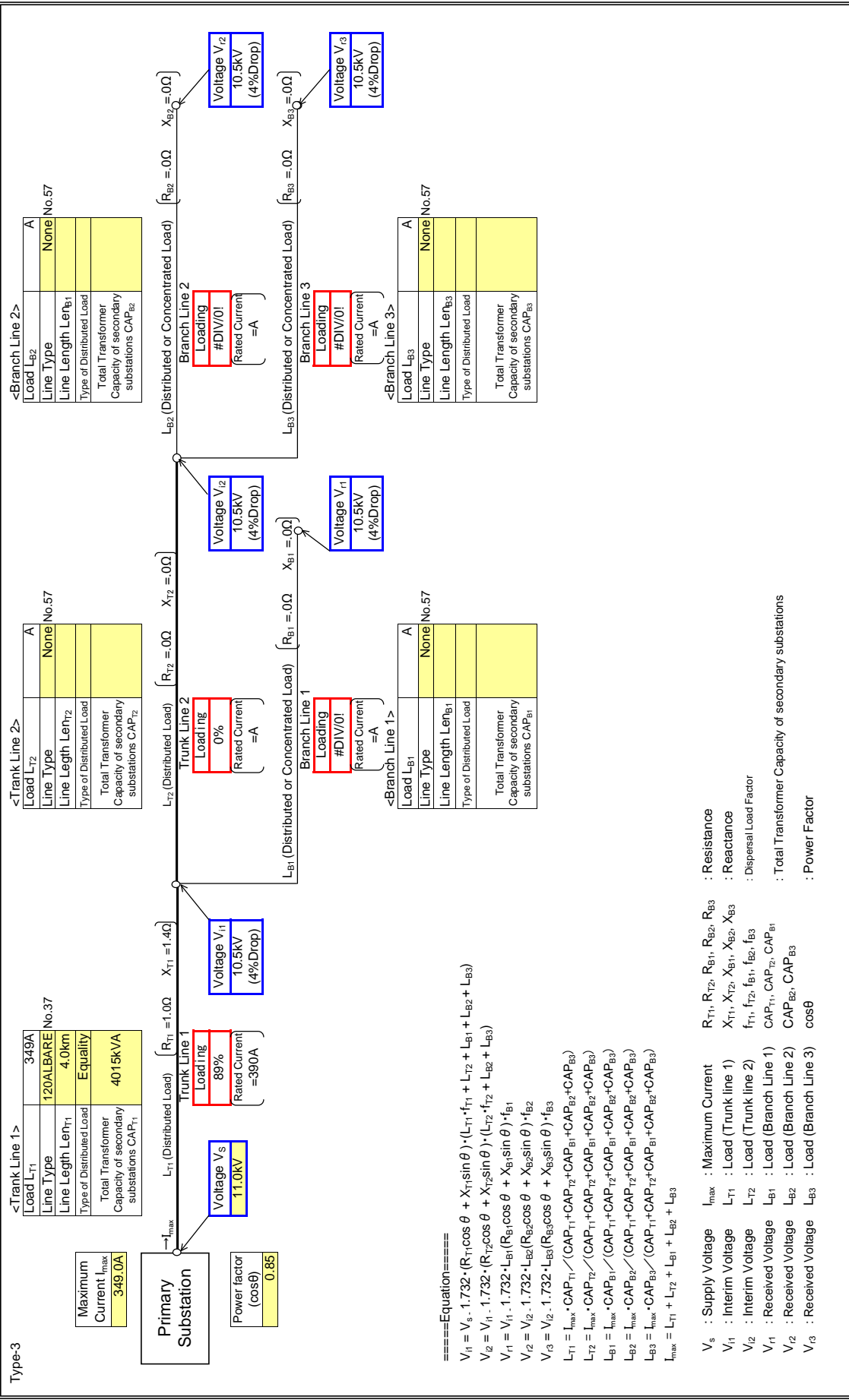
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

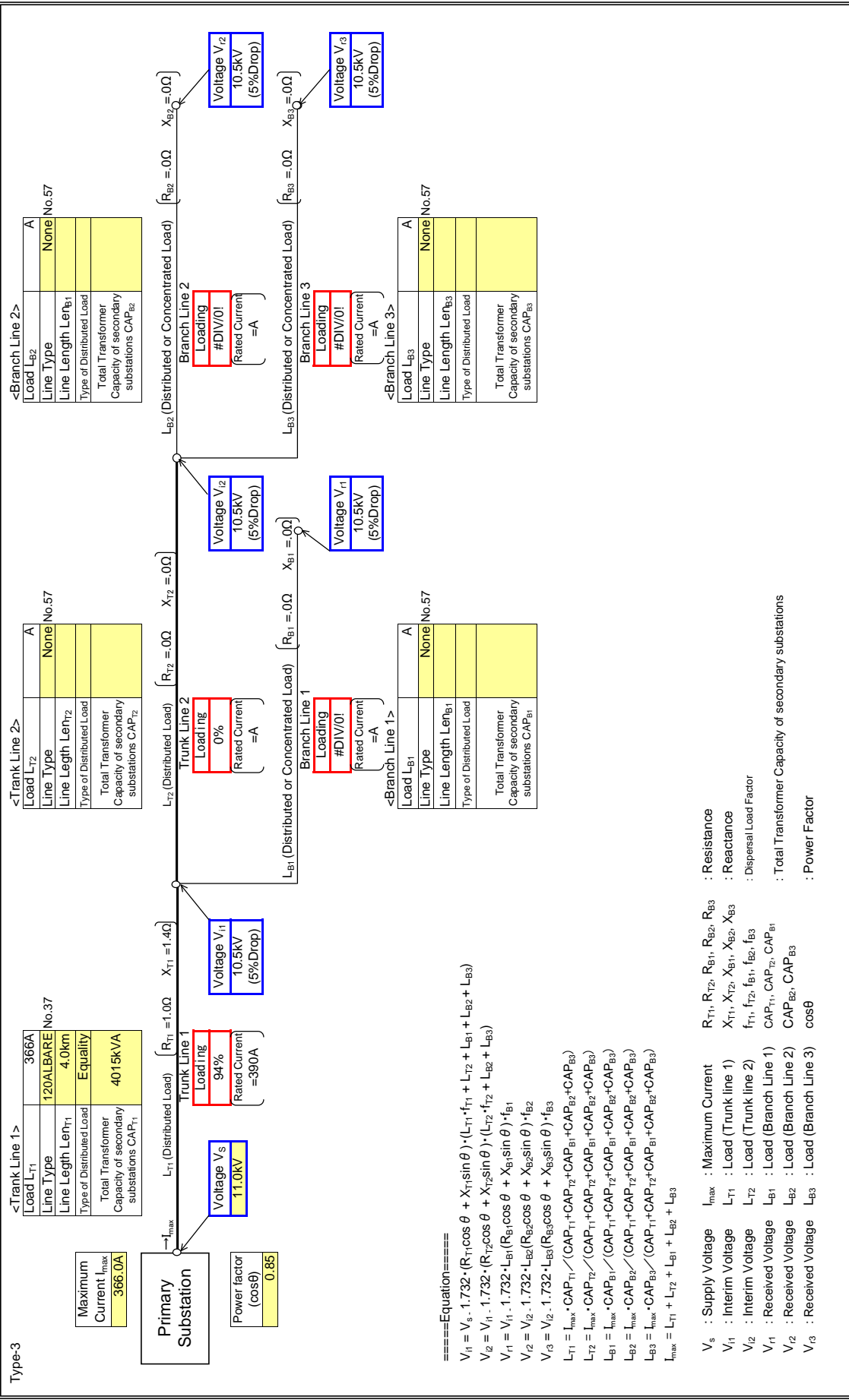
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

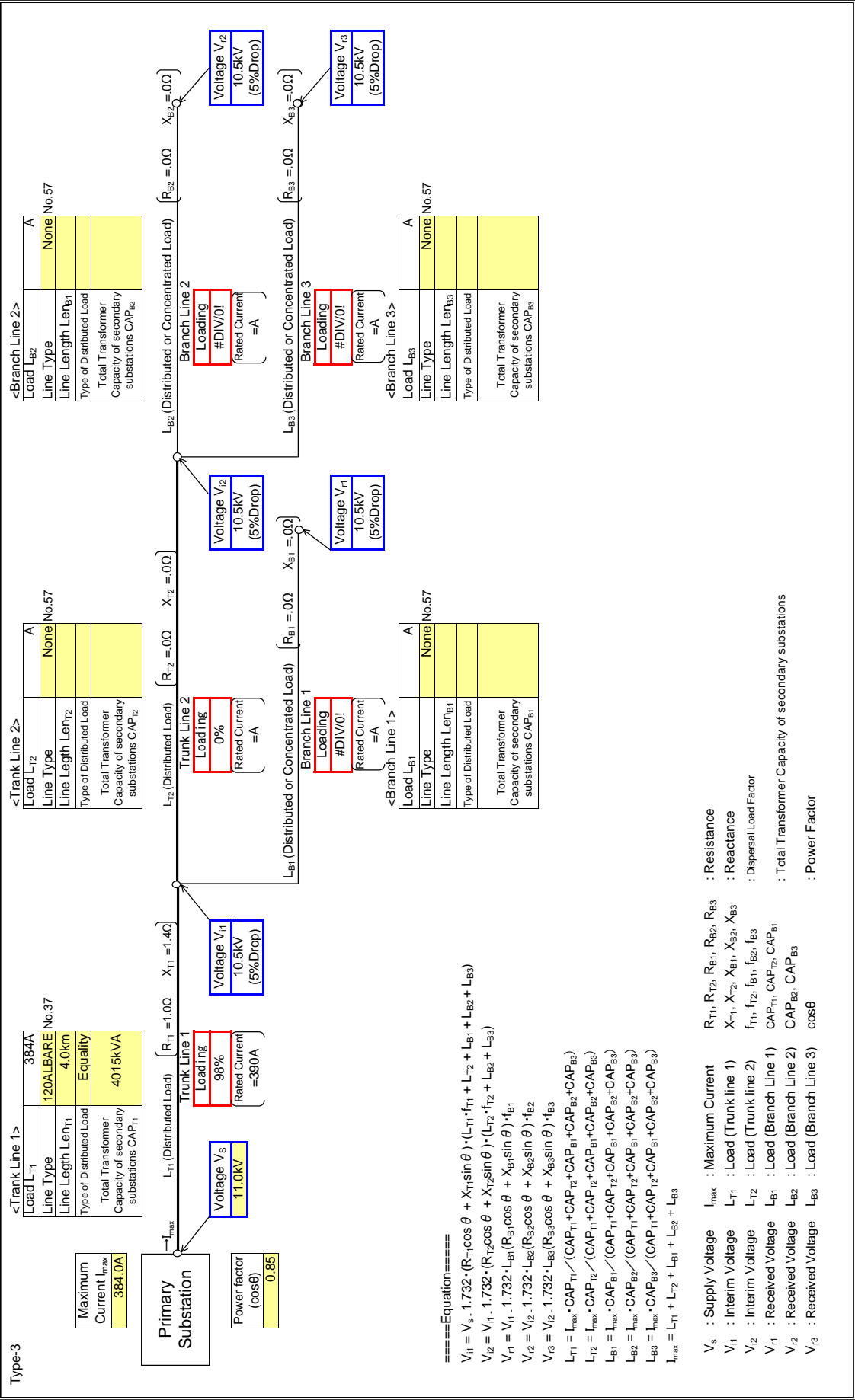
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

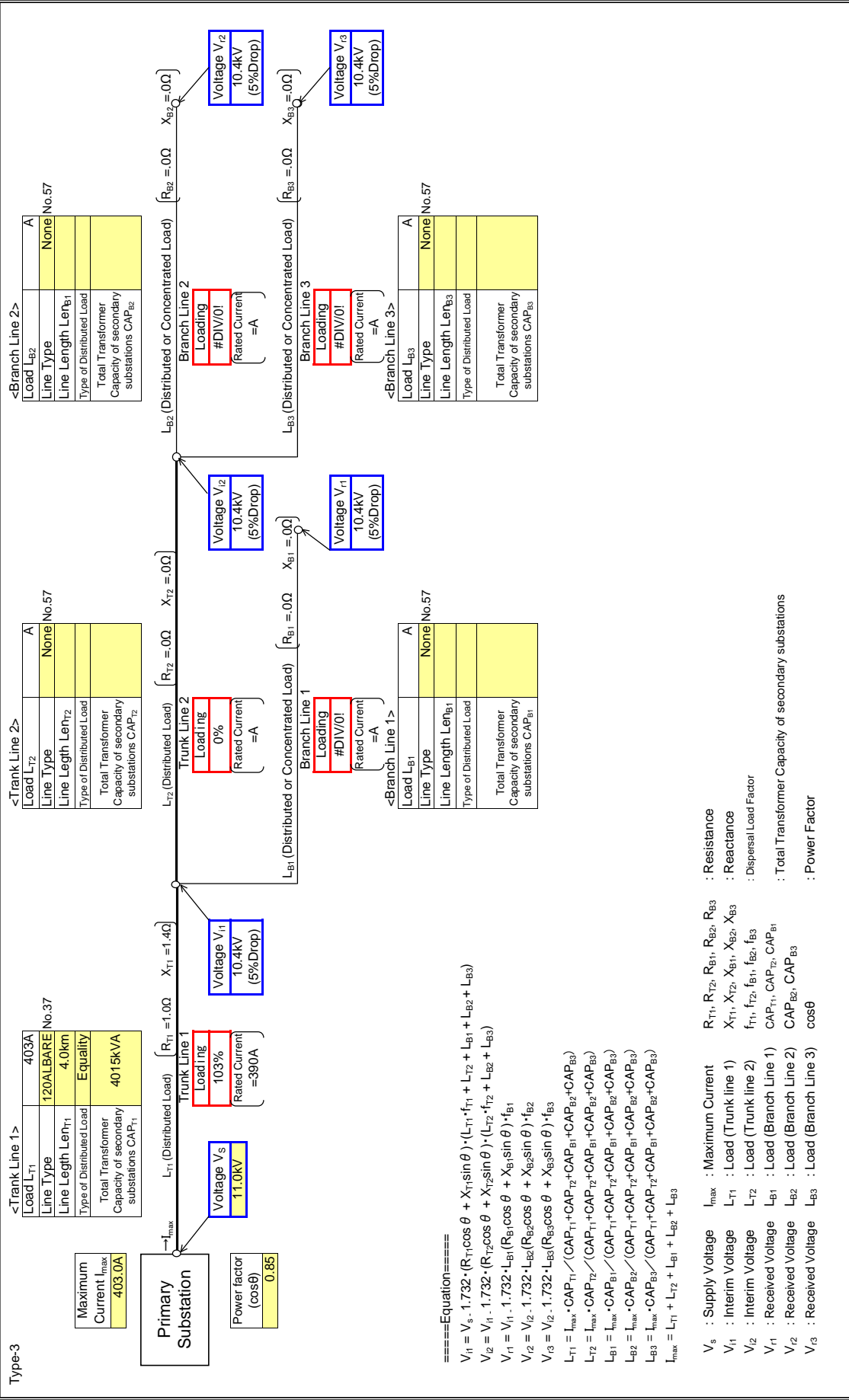
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

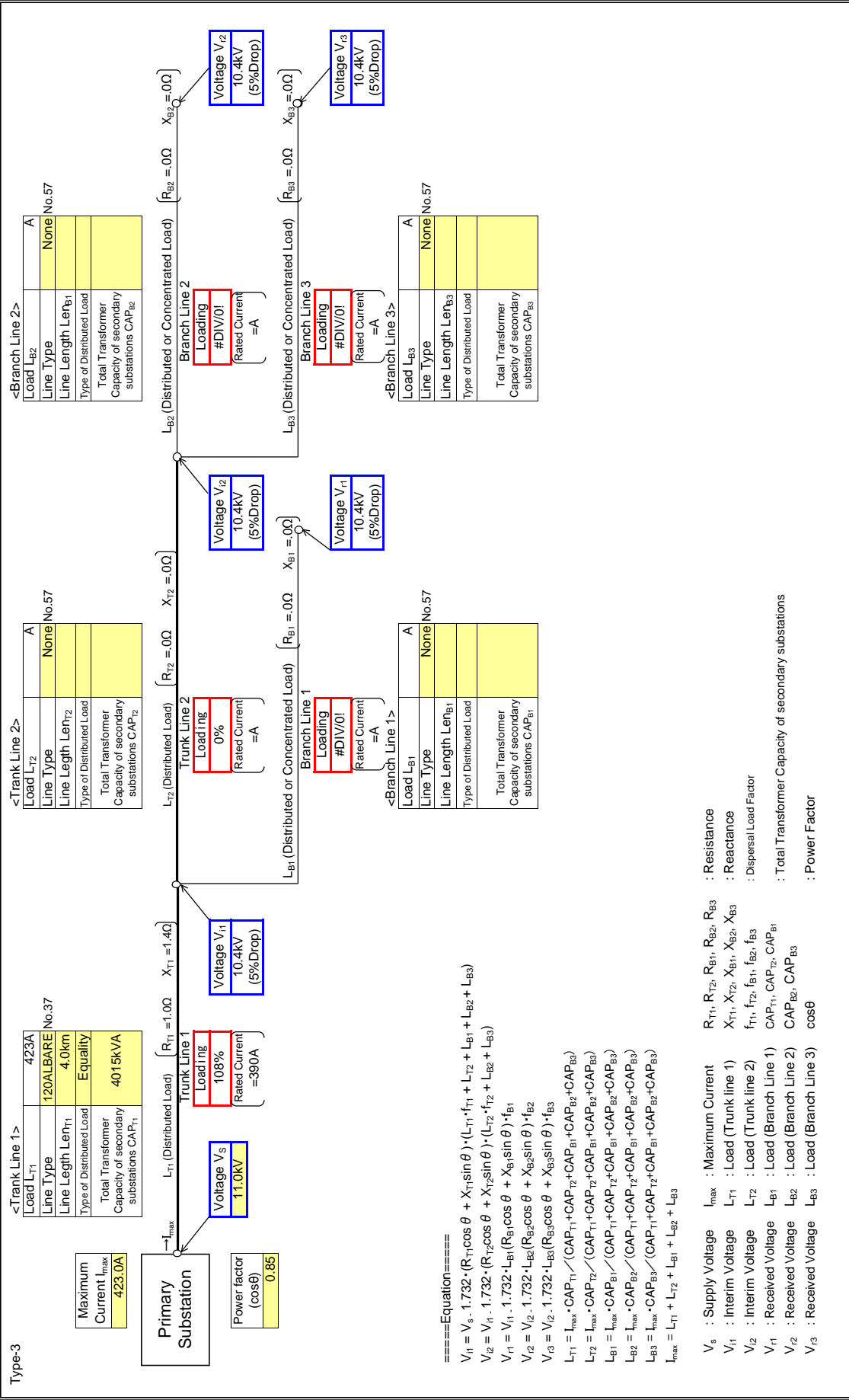
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

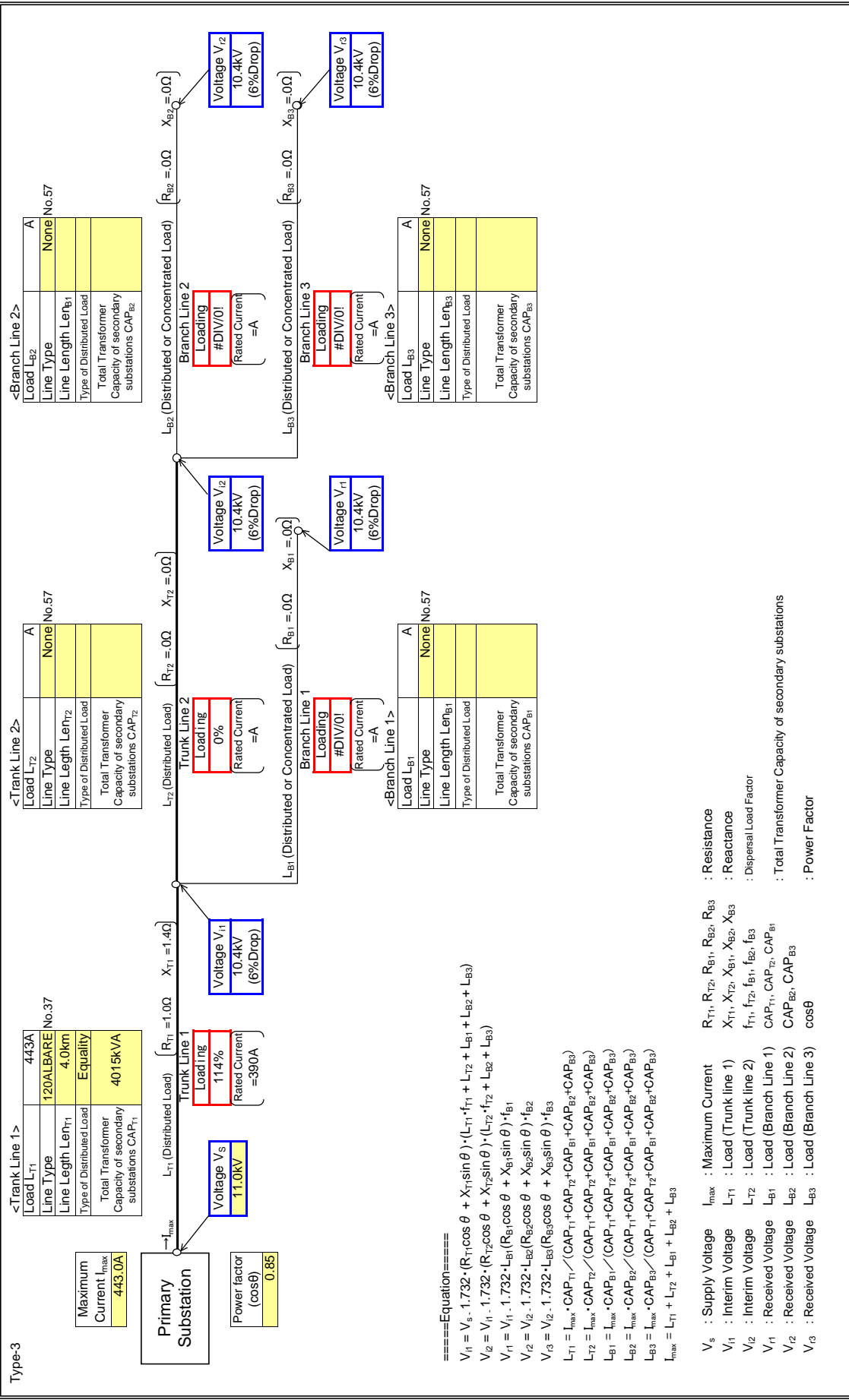
Input data in colored cells



Power System Analysis for Step A - Power System Analysis for existing system using Macro demand forecast -

Substation Name	STATION
Feeder Name	V11

Input data in colored cells



====Equation====

$$V_{i1} = V_s \cdot 1.732 \cdot (R_{T1} \cos \theta + X_{T1} \sin \theta) \cdot (L_{T1} \cdot f_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3})$$

$$V_{i2} = V_{i1} \cdot 1.732 \cdot (R_{T2} \cos \theta + X_{T2} \sin \theta) \cdot (L_{T2} \cdot f_{T2} + L_{B2} + L_{B3})$$

$$V_{i3} = V_{i2} \cdot 1.732 \cdot (R_{B1} \cos \theta + X_{B1} \sin \theta) \cdot f_{B1}$$

$$V_{i2} = V_{i2} \cdot 1.732 \cdot (R_{B2} \cos \theta + X_{B2} \sin \theta) \cdot f_{B2}$$

$$V_{i3} = V_{i2} \cdot 1.732 \cdot (R_{B3} \cos \theta + X_{B3} \sin \theta) \cdot f_{B3}$$

$$L_{T1} = I_{max} \cdot CAP_{T1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{T2} = I_{max} \cdot CAP_{T2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B1} = I_{max} \cdot CAP_{B1} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B2} = I_{max} \cdot CAP_{B2} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$L_{B3} = I_{max} \cdot CAP_{B3} / (CAP_{T1} + CAP_{T2} + CAP_{B1} + CAP_{B2} + CAP_{B3})$$

$$I_{max} = L_{T1} + L_{T2} + L_{B1} + L_{B2} + L_{B3}$$

V_s : Supply Voltage I_{max} : Maximum Current $R_{T1}, R_{T2}, R_{B1}, R_{B2}, R_{B3}$: Resistance

V_{i1} : Interim Voltage L_{T1} : Load (Trunk line 1) $X_{T1}, X_{T2}, X_{B1}, X_{B2}, X_{B3}$: Reactance

V_{i2} : Interim Voltage L_{T2} : Load (Trunk line 2) $f_{T1}, f_{T2}, f_{B1}, f_{B2}, f_{B3}$: Dispersal Load Factor

V_{i1} : Received Voltage L_{B1} : Load (Branch Line 1) $CAP_{T1}, CAP_{T2}, CAP_{B1}$: Total Transformer Capacity of secondary substations

V_{i2} : Received Voltage L_{B2} : Load (Branch Line 2) CAP_{B2}, CAP_{B3} : Power Factor

V_{i3} : Received Voltage L_{B3} : Load (Branch Line 3) $\cos \theta$