Nominal Pi-Method in Medium Line Formulas

List of 20 Nominal Pi-Method in Medium Line Formulas

Nominal Pi-Method in Medium Line

1) A-Parameter in Nominal Pi Method

Open Calculator

fx $$A_{pi} = 1 + \left(Y_{pi} \cdot \frac{Z_{pi}}{2}\right)$$

ex $$1.09555 = 1 + \left(0.021\text{S} \cdot \frac{9.1\Omega}{2}\right)$$

2) B Parameter for Reciprocal Network in Nominal Pi Method

Open Calculator

fx $$B_{pi} = \frac{(A_{pi} \cdot D_{pi}) - 1}{C_{pi}}$$

ex $$8.797727\Omega = \frac{(1.095 \cdot 1.09) - 1}{0.022\text{S}}$$

3) C Parameter in Nominal Pi Method

Open Calculator

fx $$C_{pi} = Y_{pi} \cdot \left(1 + \left(Y_{pi} \cdot \frac{Z_{pi}}{4}\right)\right)$$

ex $$0.022003\text{S} = 0.021\text{S} \cdot \left(1 + \left(0.021\text{S} \cdot \frac{9.1\Omega}{4}\right)\right)$$

4) D Parameter in Nominal Pi Method

Open Calculator

fx $$D_{pi} = 1 + \left(Z_{pi} \cdot \frac{Y_{pi}}{2}\right)$$

ex $$1.09555 = 1 + \left(9.1\Omega \cdot \frac{0.021S}{2}\right)$$

5) Impedance using A Parameter in Nominal Pi Method

Open Calculator

fx $$Z_{pi} = 2 \cdot \frac{A_{pi} - 1}{Y_{pi}}$$

ex $$9.047619\Omega = 2 \cdot \frac{1.095 - 1}{0.021S}$$

6) Load Current using Losses in Nominal Pi Method

Open Calculator

fx $$I_{L(pi)} = \sqrt{\frac{P_{loss(pi)}}{R_{pi}}}$$

ex $$3.361508A = \sqrt{\frac{85.2W}{7.54\Omega}}$$

7) Load Current using Transmission Efficiency in Nominal Pi Method

Open Calculator

fx $$I_{L(pi)} = \sqrt{\frac{\left(\frac{P_{r(pi)}}{\eta_{pi}}\right) - P_{r(pi)}}{R_{pi} \cdot 3}}$$

ex $$5.836114\text{A} = \sqrt{\frac{\left(\frac{250.1\text{W}}{0.745}\right) - 250.1\text{W}}{7.54\Omega \cdot 3}}$$

8) Losses in Nominal Pi Method

Open Calculator

fx $$P_{loss(pi)} = \left(I_{L(pi)}^2\right) \cdot R_{pi}$$

ex $$85.12358\text{W} = \left((3.36\text{A})^2\right) \cdot 7.54\Omega$$

9) Losses using Transmission Efficiency in Nominal Pi Method

Open Calculator

fx $$P_{loss(pi)} = \left(\frac{P_{r(pi)}}{\eta_{pi}}\right) - P_{r(pi)}$$

ex $$85.6047\text{W} = \left(\frac{250.1\text{W}}{0.745}\right) - 250.1\text{W}$$

10) Receiving End Angle using Transmission Efficiency in Nominal Pi Method

Open Calculator

$$\Phi_{r(pi)} = a\cos\left(\frac{\eta_{pi} \cdot P_{s(pi)}}{3 \cdot I_{r(pi)} \cdot V_{r(pi)}}\right)$$

$$87.99815° = a\cos\left(\frac{0.745 \cdot 335\text{W}}{3 \cdot 7.44\text{A} \cdot 320.1\text{V}}\right)$$

11) Receiving End Current using Transmission Efficiency in Nominal Pi Method

Open Calculator

$$I_{r(pi)} = \frac{\eta_{pi} \cdot P_{s(pi)}}{3 \cdot V_{r(pi)} \cdot \left(\cos\left(\Phi_{r(pi)}\right)\right)}$$

$$7.409857\text{A} = \frac{0.745 \cdot 335\text{W}}{3 \cdot 320.1\text{V} \cdot (\cos(87.99°))}$$

12) Receiving End Voltage using Sending End Power in Nominal Pi Method

Open Calculator

$$V_{r(pi)} = \frac{P_{s(pi)} - P_{loss(pi)}}{I_{r(pi)} \cdot \cos\left(\Phi_{r(pi)}\right)}$$

$$957.2716\text{V} = \frac{335\text{W} - 85.2\text{W}}{7.44\text{A} \cdot \cos(87.99°)}$$

13) Receiving End Voltage using Voltage Regulation in Nominal Pi Method

Open Calculator

$$V_{r(pi)} = \frac{V_{s(pi)}}{\%V_{pi} + 1}$$

$$321.9512\text{V} = \frac{396\text{V}}{0.23 + 1}$$

14) Resistance using Losses in Nominal Pi Method

Open Calculator

$$R_{pi} = \frac{P_{loss(pi)}}{I_{L(pi)}^2}$$

$$7.546769\Omega = \frac{85.2\text{W}}{(3.36\text{A})^2}$$

15) Sending End Current using Transmission Efficiency in Nominal Pi Method

Open Calculator

$$I_{s(pi)} = \frac{P_{r(pi)}}{3 \cdot \cos\left(\Phi_{s(pi)}\right) \cdot \eta_{pi} \cdot V_{s(pi)}}$$

$$0.304772\text{A} = \frac{250.1\text{W}}{3 \cdot \cos(22^\circ) \cdot 0.745 \cdot 396\text{V}}$$

16) Sending End Power using Transmission Efficiency in Nominal Pi Method

Open Calculator

$$P_{s(pi)} = \frac{P_{r(pi)}}{\eta_{pi}}$$

$$335.7047\text{W} = \frac{250.1\text{W}}{0.745}$$

17) Sending End Voltage using Transmission Efficiency in Nominal Pi Method

Open Calculator

$$V_{s(pi)} = \frac{P_{r(pi)}}{3 \cdot \cos\left(\Phi_{s(pi)}\right) \cdot I_{s(pi)}} / \eta_{pi}$$

$$402.2991\text{V} = \frac{250.1\text{W}}{3 \cdot \cos(22°) \cdot 0.3\text{A}} / 0.745$$

18) Sending End Voltage using Voltage Regulation in Nominal Pi Method

Open Calculator

$$V_{s(pi)} = V_{r(pi)} \cdot (\%V_{pi} + 1)$$

$$393.723\text{V} = 320.1\text{V} \cdot (0.23 + 1)$$

19) Transmission Efficiency (Nominal Pi Method)

Open Calculator

$$\eta_{pi} = \frac{P_{r(pi)}}{P_{s(pi)}}$$

ex $$0.746567 = \frac{250.1\text{W}}{335\text{W}}$$

20) Voltage Regulation (Nominal Pi Method)

Open Calculator

$$\%V_{pi} = \frac{V_{s(pi)} - V_{r(pi)}}{V_{r(pi)}}$$

ex $$0.237113 = \frac{396\text{V} - 320.1\text{V}}{320.1\text{V}}$$

Variables Used

- **$\%V_{pi}$** Voltage Regulation in PI
- **A_{pi}** A Parameter in PI
- **B_{pi}** B Parameter in PI *(Ohm)*
- **C_{pi}** C Parameter in PI *(Siemens)*
- **D_{pi}** D Parameter in PI
- **$I_{L(pi)}$** Load Current in PI *(Ampere)*
- **$I_{r(pi)}$** Receiving End Current in PI *(Ampere)*
- **$I_{s(pi)}$** Sending End Current in PI *(Ampere)*
- **$P_{loss(pi)}$** Power Loss in PI *(Watt)*
- **$P_{r(pi)}$** Receiving End Power in PI *(Watt)*
- **$P_{s(pi)}$** Sending End Power in PI *(Watt)*
- **R_{pi}** Resistance in PI *(Ohm)*
- **$V_{r(pi)}$** Receiving End Voltage in PI *(Volt)*
- **$V_{s(pi)}$** Sending End Voltage in PI *(Volt)*
- **Y_{pi}** Admittance in PI *(Siemens)*
- **Z_{pi}** Impedance in PI *(Ohm)*
- **η_{pi}** Transmission Efficiency in PI
- **$\Phi_{r(pi)}$** Receiving End Phase Angle in PI *(Degree)*
- **$\Phi_{s(pi)}$** Sending End Phase Angle in PI *(Degree)*

Constants, Functions, Measurements used

- Function: **acos**, acos(Number)
  Inverse trigonometric cosine function
- Function: **cos**, cos(Angle)
  Trigonometric cosine function
- Function: **sqrt**, sqrt(Number)
  Square root function
- Measurement: **Electric Current** in Ampere (A)
  Electric Current Unit Conversion
- Measurement: **Power** in Watt (W)
  Power Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Electric Resistance** in Ohm (Ω)
  Electric Resistance Unit Conversion
- Measurement: **Electric Conductance** in Siemens (S)
  Electric Conductance Unit Conversion
- Measurement: **Electric Potential** in Volt (V)
  Electric Potential Unit Conversion

Check other formula lists

- End Condenser Method in Medium Line Formulas
- Nominal Pi-Method in Medium Line Formulas
- Nominal T-Method in Medium Line Formulas

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