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Nominal Pi-Method in Medium Line Formulas

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List of 20 Nominal Pi-Method in Medium Line Formulas

Nominal Pi-Method in Medium Line

1) A-Parameter in Nominal Pi Method

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

Open Calculator 

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

2) B Parameter for Reciprocal Network in Nominal Pi Method

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

Open Calculator 

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

3) C Parameter in Nominal Pi Method

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

Open Calculator 

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



4) D Parameter in Nominal Pi Method

[Open Calculator !\[\]\(4729e517bc6a7cd81c8025b9646574fb_img.jpg\)](#)

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

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

5) Impedance using A Parameter in Nominal Pi Method

[Open Calculator !\[\]\(e474458956c9a37fbf9586ddb60a7fa1_img.jpg\)](#)

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

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

6) Load Current using Losses in Nominal Pi Method

[Open Calculator !\[\]\(4fe57c3593bf1b21d272ae7ac8dfaf77_img.jpg\)](#)

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

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



7) Load Current using Transmission Efficiency in Nominal Pi Method

[Open Calculator !\[\]\(dfbd6b3763a6d1d9afaa974f64e2e4b5_img.jpg\)](#)

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

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

8) Losses in Nominal Pi Method

[Open Calculator !\[\]\(ec9132f1d27c8919987d92907322654d_img.jpg\)](#)

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

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

9) Losses using Transmission Efficiency in Nominal Pi Method

[Open Calculator !\[\]\(758ebdf4629c903da74c2e079717ae32_img.jpg\)](#)

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

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



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

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

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)](#)

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



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



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

[Open Calculator](#)

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

14) Resistance using Losses in Nominal Pi Method



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

[Open Calculator](#)

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

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



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

[Open Calculator](#)

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



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

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

[Open Calculator !\[\]\(9dfdaff1d86ba3c1f8353b4d1b61b8c5_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(2b376d1a92330ab09dad2665d2f89bf5_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(c444627dab9fee9a1550c053ffaaaae2_img.jpg\)](#)

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



19) Transmission Efficiency (Nominal Pi Method)

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

[Open Calculator !\[\]\(6605b201d6f14d9b3bcb8ab5f274d107_img.jpg\)](#)

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

20) Voltage Regulation (Nominal Pi Method)

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

[Open Calculator !\[\]\(e8fb589d58dad1692debababa5e928b6_img.jpg\)](#)

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









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**, $\text{acos}(\text{Number})$
Inverse trigonometric cosine function
- **Function:** **cos**, $\text{cos}(\text{Angle})$
Trigonometric cosine function
- **Function:** **sqrt**, $\text{sqrt}(\text{Number})$
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 ($^{\circ}$)
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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