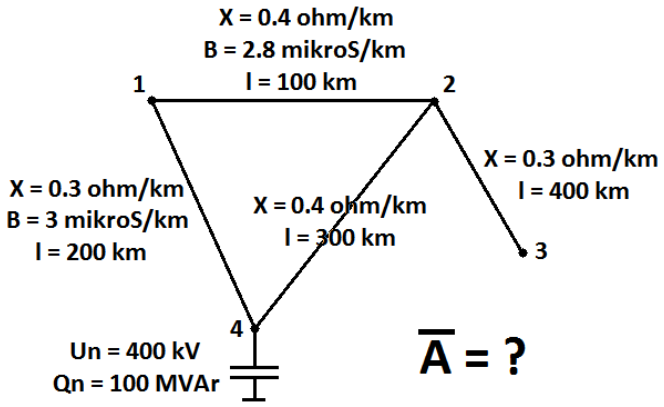
Example: Calculate all elements of the bus admittance matrix. Note: Do not forget to use the correct sign for the shunt compensator.



Calculation:

$$\overline{Y}_{12} = \frac{1}{jXl} = -j0.025\,S$$

$$\overline{Y}_{120} = jBl/2 = j0.00014\,S$$

$$\overline{Y}_{14} = \frac{1}{jXl} = -j0.01666\,S$$

$$\overline{Y}_{140} = jBl/2 = j0.0003\,S$$

$$\overline{Y}_{23} = \frac{1}{jXl} = -j0.00833\,S$$

$$\overline{Y}_{230} = 0S$$

$$\overline{Y}_{24} = \frac{1}{jXl} = -j0.00833\,S$$

$$\overline{Y}_{240} = 0S$$

$$\overline{Y}_{40} = +j\frac{Q_n}{U_n^2} = j0.000625\,S$$

Admittance matrix will have the following form:

$$\underline{\overline{A}} = \begin{bmatrix} \overline{Y}_{12}+\overline{Y}_{120}+\overline{Y}_{14}+\overline{Y}_{140} & -\overline{Y}_{12} & 0 & -\overline{Y}_{14} \\ -\overline{Y}_{12} & \overline{Y}_{12}+\overline{Y}_{120}+\overline{Y}_{23}+\overline{Y}_{24} & -\overline{Y}_{23} & -\overline{Y}_{24} \\ 0 & -\overline{Y}_{23} & \overline{Y}_{23} & 0 \\ -\overline{Y}_{14} & -\overline{Y}_{24} & 0 & \overline{Y}_{14}+\overline{Y}_{140}+\overline{Y}_{24}+\overline{Y}_{40} \end{bmatrix}$$

When putting all the values inside:

$$\underline{\overline{A}} = j\begin{bmatrix} -0.04122 & 0.025 & 0 & 0.01666 \\ 0.025 & -0.04152 & 0.00833 & 0.00833 \\ 0 & 0.00833 & -0.00833 & 0 \\ 0.01666 & 0.00833 & 0 & -0.024065 \end{bmatrix} S\,.$$