

ECE 523 Lecture 7

- Note: I reformatted the document for easier printing

$$a := e^{j \cdot 120 \text{deg}}$$

$$A_{012} := \begin{pmatrix} 1 & 1 & 1 \\ 1 & a^2 & a \\ 1 & a & a^2 \end{pmatrix} \quad 3(A_{012})^{-1} = \begin{pmatrix} 1 & 1 & 1 \\ 1 & -0.5 + 0.866i & -0.5 - 0.866i \\ 1 & -0.5 - 0.866i & -0.5 + 0.866i \end{pmatrix}$$

$$I_{abc} := \begin{pmatrix} 10A \\ 11A \\ 13A \end{pmatrix} \quad A_{012_{1,1}} = -0.5 - 0.866i$$

$$I_{A012} := A_{012}^{-1} \cdot I_{abc}$$

$$I_{A012} = \begin{pmatrix} 11.333 \\ -0.667 - 0.577i \\ -0.667 + 0.577i \end{pmatrix} A$$

$$I_{A012_0} = 11.333 A$$

$$|I_{A012_1}| = 0.882 A \quad \arg(I_{A012_1}) = -139.107 \cdot \text{deg}$$

$$\overrightarrow{|I_{A012}|} = \begin{pmatrix} 11.333 \\ 0.882 \\ 0.882 \end{pmatrix} A \quad \overrightarrow{\arg(I_{A012})} = \begin{pmatrix} 0 \\ -139.107 \\ 139.107 \end{pmatrix} \cdot \text{deg}$$

- Dominator by zero sequence current

$$B_{012} := \begin{pmatrix} 1 & a & a^2 \\ 1 & 1 & 1 \\ 1 & a^2 & a \end{pmatrix}$$

$$C_{012} := \begin{pmatrix} 1 & a^2 & a \\ 1 & a & a^2 \\ 1 & 1 & 1 \end{pmatrix}$$

$$I_{B012} := B_{012}^{-1} \cdot I_{abc}$$

$$I_{C012} := C_{012}^{-1} \cdot I_{abc}$$

$$I_{B012} = \begin{pmatrix} 11.333 \\ -0.167 + 0.866i \\ -0.167 - 0.866i \end{pmatrix} \text{ A}$$

$$\overrightarrow{|I_{B012}|} = \begin{pmatrix} 11.333 \\ 0.882 \\ 0.882 \end{pmatrix} \text{ A}$$

$$\overrightarrow{\arg(I_{B012})} = \begin{pmatrix} 0 \\ 100.893 \\ -100.893 \end{pmatrix} \cdot \text{deg}$$

$$I_{A012} = \begin{pmatrix} 11.333 \\ -0.667 - 0.577i \\ -0.667 + 0.577i \end{pmatrix} \text{ A}$$

$$\overrightarrow{|I_{A012}|} = \begin{pmatrix} 11.333 \\ 0.882 \\ 0.882 \end{pmatrix} \text{ A}$$

$$\overrightarrow{\arg(I_{A012})} = \begin{pmatrix} 0 \\ -139.107 \\ 139.107 \end{pmatrix} \cdot \text{deg}$$

$$I_{C012} = \begin{pmatrix} 11.333 \\ 0.833 - 0.289i \\ 0.833 + 0.289i \end{pmatrix} \text{ A}$$

$$\overrightarrow{|I_{C012}|} = \begin{pmatrix} 11.333 \\ 0.882 \\ 0.882 \end{pmatrix} \text{ A}$$

$$\overrightarrow{\arg(I_{C012})} = \begin{pmatrix} -1.403 \times 10^{-15} \\ -19.107 \\ 19.107 \end{pmatrix} \cdot \text{deg}$$