Wind Project

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Transformation to d-q-Frame :

$$\begin{pmatrix} i_{sd} \\ i_{sq} \end{pmatrix} = \frac{2}{3} \begin{pmatrix} \cos\theta & \cos\left(\theta - \frac{2\pi}{3}\right) & \cos\left(\theta + \frac{2\pi}{3}\right) \\ -\sin\theta & -\sin\left(\theta - \frac{2\pi}{3}\right) & -\sin\left(\theta + \frac{2\pi}{3}\right) \end{pmatrix} \begin{pmatrix} i_{sa} \\ i_{sb} \\ i_{sc} \end{pmatrix}$$

$\Rightarrow$ assume $\theta = 0°$

$$\begin{pmatrix} i_{sd} \\ i_{sq} \end{pmatrix} = \begin{pmatrix} \frac{2}{3} & -\frac{1}{3} & -\frac{1}{3} \\ 0 & \frac{1}{\sqrt{3}} & -\frac{1}{\sqrt{3}} \end{pmatrix} \begin{pmatrix} i_{sa} \\ i_{sb} \\ i_{sc} \end{pmatrix}$$

$$\begin{pmatrix} i_{sd} \\ i_{sq} \end{pmatrix} = \begin{pmatrix} \frac{2}{3} i_{sa} & -\frac{1}{3} i_{sb} & -\frac{1}{3} i_{sc} \\ & \frac{1}{\sqrt{3}} i_{sb} & -\frac{1}{\sqrt{3}} i_{sc} \end{pmatrix}$$

$$\Rightarrow \frac{3}{4}(i_{sd} + i_{sq}) = \frac{3}{4}\left(\frac{2}{3} i_{sa} + \left(\frac{1}{\sqrt{3}} - \frac{1}{3}\right) i_{sb} - \left(\frac{1}{\sqrt{3}} + \frac{1}{3}\right) i_{sc}\right)$$

$$= \frac{1}{2} \cdot \frac{3}{2}\left(\frac{2}{3} i_{sa} + \frac{3-\sqrt{3}}{3\sqrt{3}} i_{sb} - \frac{3+\sqrt{3}}{3\sqrt{3}} i_{sc}\right)$$

$$\frac{3}{4}(i_{sd} + i_{sq}) = \frac{1}{2}\left(i_{sa} + \frac{6-2\sqrt{3}}{\sqrt{3}} i_{sb} - \frac{6+2\sqrt{3}}{\sqrt{3}} i_{sc}\right)$$

$$\Rightarrow \frac{3}{4}(m_d i_{sd} + m_q i_{sq}) = \frac{1}{2}\left(m_a i_{sa} + m_b i_{sb} + m_c i_{sc}\right) = i_{dc}$$