$$\% \mathcal{V}_R = K_c \{ R_{eq} \} \cos\varphi + x_{eq}\sin\varphi \} \xrightarrow{\text{max}} P_{cu} = K_c^2 P_{cun}$$

$$\qquad\qquad\qquad\qquad\qquad \underset{p.u}{P_{cun}} \qquad \underset{p.u}{P_{cun}}$$

$$[0\wedge - 100 = \text{\tiny?} \text{\tiny?}\times P_{cam}] \Rightarrow P_{cun} = P_{oo}w \quad P_{cun} = R_{eq}$$

$$\underset{p.u}{R_{eq}} = \frac{P_{oo}}{10\times 10^c} = \%\cdot 0^r \qquad \% \mathcal{V}_{Rmax} = \cos\varphi = \cos\varphi_{eq} = \frac{R_{eq}}{|Z_{eq}|} \quad \text{\tiny?}\%\, Y$$

$$\underset{p.u}{Z_{eq}} = \%\cdot\delta \qquad \underset{p.u}{x_{eq}} = \%\cdot 0^r \qquad \% \mathcal{V}_R = \%\cdot 0^r \times\%\cdot 1\wedge + \%\cdot 0^r\times\%\cdot Y = F, \wedge\%$$

$$\frac{S_n^A}{S_n^B} = \left| \frac{Z_{eq}^b}{Z_{eq}^\delta} \right| = \frac{100}{\Gamma 00} = \sqrt{\frac{\Gamma^r + \epsilon^r}{R_{eq}^r + \wedge^r}} \Rightarrow R_{eq}\text{\tiny H.V} = Y\,\Omega \qquad \Sigma$$

$$\underset{p.u}{Z_{eq}} = \underset{p.u}{\mathcal{V}_{scn}} = \mathcal{V}_{Rmax}\bigg|_{K_c=1} = \frac{1}{(I_{sc})\,p.u} \qquad \Sigma$$

$$\underset{p.u}{Z_{eq}} = \frac{1}{\Gamma 0} = \frac{\delta}{100} \qquad \mathcal{V}_R\% = 0 \quad \cos\varphi = \sin\varphi_{eq} = \frac{x_{eq}}{Z_{eq}} \quad \text{\tiny?}\%\wedge$$

$$\text{\tiny?}\wedge = \frac{x_{eq}}{\%\delta} \qquad \underset{p.u}{x_{eq}} = \%\cdot 0^r \qquad R_{eq} = \sqrt{Z_{eq}^r - x_{eq}^r} = \%\cdot 0^r$$

$$\underset{p.u}{P_{cun}} = \underset{p.u}{R_{eq}} = \%\cdot 0^r \qquad P_{cun} = \frac{r}{100}\times 1000 = \Gamma 0\,kw$$

$$\% \mathcal{V}_{Rmax} \rightarrow \cos\varphi_b = \frac{R_{eq}}{Z_{eq}} = a = \frac{1}{\sqrt{1^r + \delta^r}} \Rightarrow \% \mathcal{V}_R = 0$$

$$\cos\varphi = \frac{x_{eq}}{Z_{eq}} = \sqrt{1 - a^r} \qquad \cos\varphi_b = \sqrt{1 - \frac{1}{\Gamma Y}} = \frac{\delta}{\sqrt{\Gamma Y}} \quad \text{شتاب زاد}$$

$$I_1 = \frac{Z_r}{Z_1 + Z_r}\, I = \frac{r + Yj}{\delta + 10j}\times \Gamma 00\,(\%\wedge - j\text{\tiny?}Y) \qquad I_1 = Y\epsilon 0\,(\%\wedge - \text{\tiny?}Yj)$$

$$S_1 = P_{00}\times\Gamma\epsilon 0\times(\%\wedge - \text{\tiny?}Yj) \qquad I_r = \frac{Z_1}{Z_1 + Z_r}\, I \qquad I_r = \frac{r + r j}{\delta + 10j}\times \Gamma 00\times(\%\wedge -)$$

$$1Y0\,(\%\wedge - \text{\tiny?}Yj) \qquad S_r = P_{00}\times 1Y0\,(\%\wedge - j\text{\tiny?}Y)$$

$$\Delta P = 1\text{\tiny?}, 1\Gamma\,kw \qquad\qquad \Delta P = P_{00}\times\Gamma\Gamma 0\%\wedge - \%\wedge\times P_{00}$$

$$\% \vartheta_{Rmax} = K \left| Z_{eq}^{P.u} \right| \times 100 \Rightarrow \delta = R_{eq}^{P.u} \times 100$$

$$\left| Z_{eq}^{P.u} \right| = \%5 \quad P_{cu} = K^2 R_{eq}^{P.u} \quad \%1 = \%5^2 R_{eq}^{P.u} \rightarrow R_{eq} = \%4$$

$$\% \vartheta_R = K \left(R_{eq}^{P.u} \cos\varphi \pm x_{eq}^{P.u} \sin\varphi \right) \times 100$$

$$\% \vartheta_R = \%8 \left(\%4 \times 0.4 + \%5^2 \times 0.8 \right) = 4.84\%$$

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$$P_{cu}^{fL} = P_{sc} = 3Kw$$

$$P_{core} = P_{oc} = 3Kw$$

$$K^2 P_{cu}^{fL} = P_{core} \rightarrow K_{max} = 1 \quad ③$$

$$\eta_{max} = \frac{K_{max} S_r}{K_{max} S + 2 P_{core}} = \frac{100}{104} = \frac{50}{52}$$