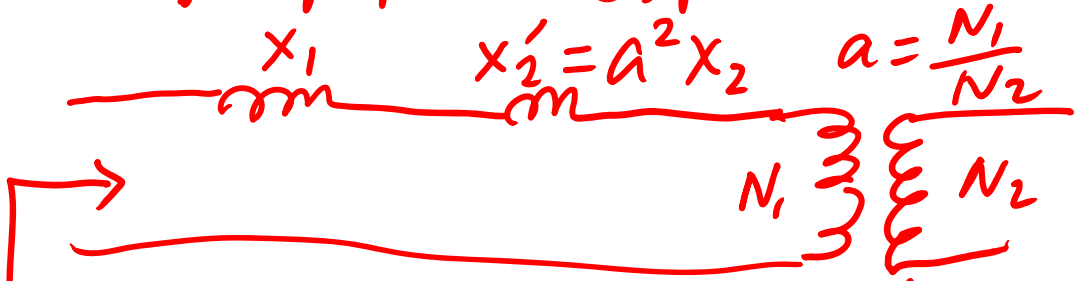
To show: $X_{p.pu} = X_{s.pu}$



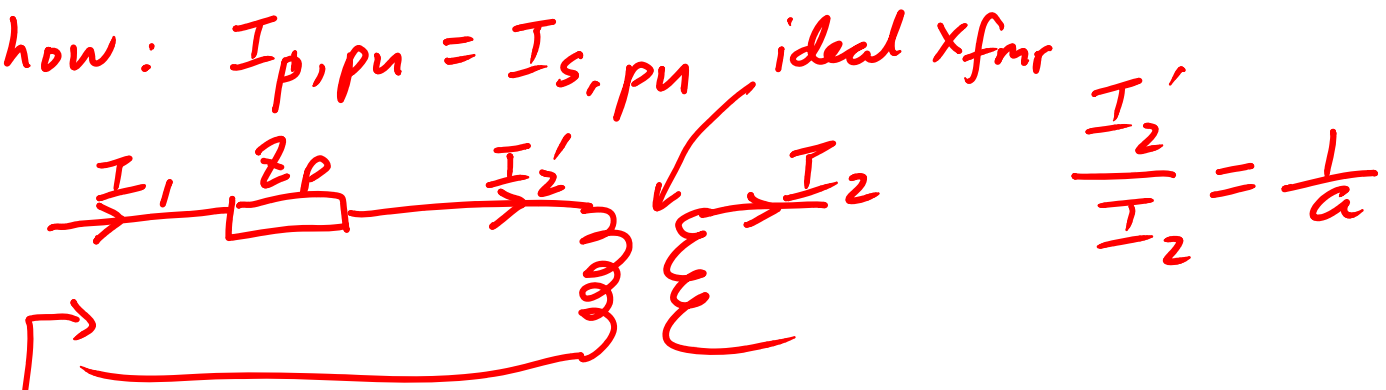
Referred to the primary side

$$X_{p.pu} = \frac{X_1 + X_2'}{Z_{p,b}} = \frac{X_1 + a^2 X_2}{\frac{(V_{p,b})^2}{S_b}}$$

Referred to the secondary side

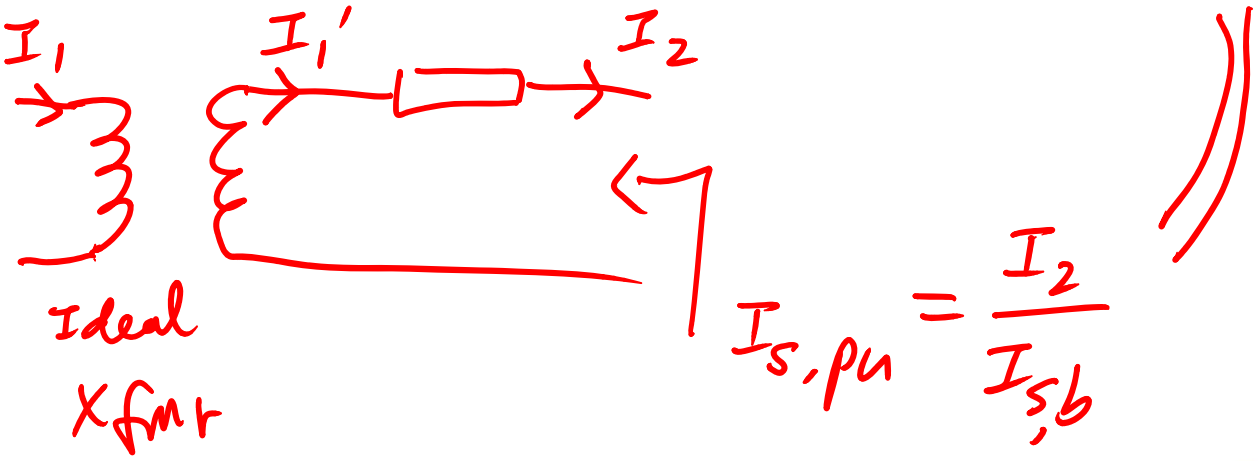
$$X_{s,pu} = \frac{X_1' + X_2}{Z_{s,b}} = \frac{\frac{1}{a^2} X_1 + X_2}{\frac{(\frac{1}{a} V_{p,b})^2}{S_b}}$$

To show: $I_{p,pu} = I_{s,pu}$



$$\frac{I_2'}{I_2} = \frac{1}{a}$$

$$I_{p,pu} = \frac{I_1}{I_{p,b}} = \frac{I_2'}{I_{p,b}} = \frac{\frac{1}{a} I_2}{\frac{1}{a} I_{s,b}} = \frac{I_2}{I_{s,b}}$$



$$I_{s,pu} = \frac{I_2}{I_{s,b}}$$