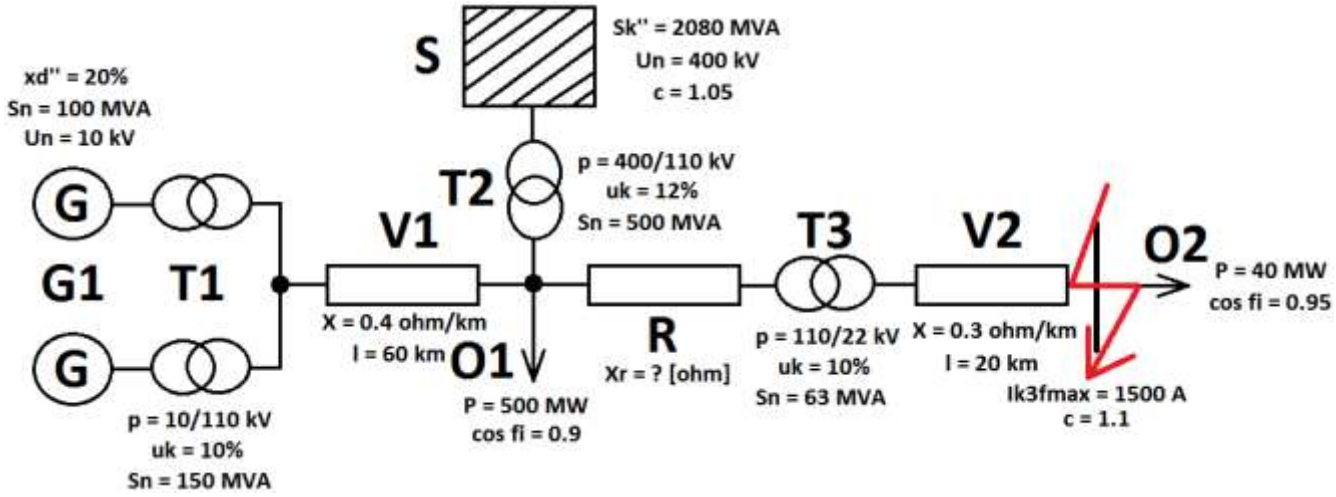
Example: Determine the minimum impedance of reactor R to limit the 3-phase short-circuit current to maximum value of 1500 A. Neglect the resistances. Consider only symmetrical power sources.



Calculation:

$$X_{G1} = \frac{x_d''}{100}\frac{U_n^2}{S_n}\frac{1}{(10/110)^2}\frac{1}{(110/22)^2} = 0.968\,\Omega$$

$$X_{T1} = \frac{u_k}{100}\frac{U_n^2}{S_n}\frac{1}{(10/110)^2}\frac{1}{(110/22)^2} = 0.322667\,\Omega$$

$$X_{V1} = Xl\frac{1}{(110/22)^2} = 0.96\,\Omega$$

$$X_{O1} = X_{O2} = \infty$$

$$X_S = \frac{cU_n}{\sqrt{3}S_k''}\frac{1}{(400/110)^2}\frac{1}{(110/22)^2} = 0.2443269\,\Omega$$

$$X_{T2} = \frac{u_k}{100}\frac{U_n^2}{S_n}\frac{1}{(400/110)^2}\frac{1}{(110/22)^2} = 0.11616\,\Omega$$

$$X_R' = X_R\frac{1}{(110/22)^2} = X_R/25\,\Omega$$

$$X_{T3} = \frac{u_k}{100}\frac{U_n^2}{S_n}\frac{1}{(110/22)^2} = 0.768254\,\Omega$$

$$X_{V2} = Xl = 6\,\Omega$$

Total short-circuit impedance is:

$$X_K = \frac{\left[\frac{1}{2}\left(X_{G1} + X_{T1}\right) + X_{V1}\right]\left(X_S + X_{T2}\right)}{\frac{1}{2}\left(X_{G1} + X_{T1}\right) + X_{V1} + X_S + X_{T2}} + X_R / 25 + X_{T3} + X_{V2} = \frac{cU_n}{\sqrt{3}I_k''}$$

After entering all input values in the equation we get:

$$7.0626358 + X_R / 25 = 9.314584$$

Solution: $X_R = 56.2987\ \Omega$.