

Rete equivalente

$$I_{cct} := 12000$$

$$I_{ccm} := 10000$$

$$V_{nr} := 130000$$

Linea L1

$$V_{nL1} := 130000$$

$$X_{l1} := 0.43$$

$$L1 := 10$$

Linea L2

$$V_{nL2} := 15000$$

$$X_{l2} := 0.35$$

$$L2 := 0.020$$

Linea L3

$$V_{nL3} := 15000$$

$$X_{l3} := 0.35$$

$$L3 := 0.010$$

Trasformatore T1 Yg-D

$$Ant1 := 60 \cdot 10^6$$

$$k_{t1} := \frac{15}{130}$$

$$v_{cct1} := 0.1$$

Trasformatore T2 Y-Yg

$$Ant2 := 400 \cdot 10^3$$

$$k_{t2} := \frac{15}{0.6}$$

$$v_{cct2} := 0.04$$

Generatore

$$Ang := 60 \cdot 10^6$$

$$V_{ng} := 15000$$

$$x_{dg} := 0.084$$

$$x_{og} := 0.06$$

$$R_g := 860$$

Motore asincrono

$$A_{nm} := 300 \cdot 10^3$$

$$V_n := 0.6$$

$$x_{lr} := 0.17$$

Soluzione

$$A_{rif} := 60 \cdot 10^6$$

Rete a monte

$$X_{rt} := \frac{V_{nr}}{\sqrt{3} \cdot I_{cct}} \quad X_{rt} = 6.25463$$

$$X_{rm1} := \frac{V_{nr}}{\sqrt{3} \cdot I_{ccm}} \quad X_{rm1} = 7.50555$$

Calcolo la reattanza omopolare della rete a monte

$$X_{rm} := 3 \cdot \frac{V_{nr}}{\sqrt{3} \cdot I_{ccm}} - 2 \cdot X_{rt} \quad X_{rm} = 10.0074$$

$$Z_{rif_130} := \frac{V_{nr}^2}{A_{rif}}$$

$$x_{rt} := \frac{X_{rt}}{Z_{rif_130}} \quad x_{rt} = 0.02221$$

$$x_{rm} := \frac{X_{rm}}{Z_{rif_130}} \quad x_{rm} = 0.03553$$

Linea L1

$$x_{l1} := \frac{X_{l1} \cdot L_1}{Z_{rif_130}} \quad x_{l1} = 0.01527$$

Linea L2

$$Z_{rif_15} := \frac{V_n L_2^2}{A_{rif}} \quad Z_{rif_15} = 3.75$$

$$x_{l2} := \frac{X_{l2} \cdot L_2}{Z_{rif_15}} \quad x_{l2} = 1.86667 \cdot 10^{-3}$$

Linea L3

$$x_{l3} := \frac{X_{l3} \cdot L_3}{Z_{rif_15}} \quad x_{l3} = 9.33333 \cdot 10^{-4}$$

Trasformatore T1

$$x_{t1} := v_{cct1} \cdot \frac{A_{rif}}{A_{nt1}}$$

$$x_{t1} = 0.1$$

Trasformatore T2

$$x_{t2} := v_{cct2} \cdot \frac{A_{rif}}{A_{nt2}}$$

$$x_{t2} = 6$$

Motore asincrono

$$x_{lr} := x_{lr} \cdot \frac{A_{rif}}{A_{nm}}$$

$$x_{lr} = 34$$

Generatore

$$r_g := \frac{R_g}{Z_{rif_15}}$$

$$r_g = 229.33333$$

Corto circuito trifase

Punto B1

$$Z1 := xrt + xl1 \quad Z1 = 0.03747$$

$$Z2 := xt1 + xl2 + xdg \quad Z2 = 0.18587$$

$$ZeqdB1 := (Z1^{-1} + Z2^{-1})^{-1} \quad ZeqdB1 = 0.03118$$

$$IcctB1 := \frac{1}{ZeqdB1} \quad IcctB1 = 32.06676 \quad Irif_{130} := \frac{Arif}{\sqrt{3} \cdot VnL1} \quad Irif_{130} = 266.46936$$

$$IcctB1 \cdot Irif_{130} = 8.54481 \cdot 10^3 \quad Irif_{15} := \frac{Arif}{\sqrt{3} \cdot VnL2} \quad Irif_{15} = 2.3094 \cdot 10^3$$

Barra

$$Z1 := xrt + xl1 + xt1 \quad Z1 = 0.13747$$

$$Z2 := xl2 + xdg \quad Z2 = 0.08587$$

$$Zeqd_barra := (Z1^{-1} + Z2^{-1})^{-1} \quad Zeqd_barra = 0.05285$$

$$Icct_barra := \frac{1}{Zeqd_barra} \quad Icct_barra = 18.92017$$

$$Icct_barra \cdot Irif_{15} = 4.36943 \cdot 10^4$$

Corto circuito monofase

Guasto in B1

$$ZeqiB1 := ZeqdB1$$

$$ZeqoB1 := [(xrm + 3 \cdot xl1)^{-1} + xt1^{-1}]^{-1} \quad ZeqoB1 = 0.04485$$

$$Id := \frac{1}{ZeqdB1 + ZeqiB1 + ZeqoB1} \quad Id = 9.32651$$

$$I_{ccm} := 3 \cdot I_d \quad I_{ccm} = 27.97953 \quad I_{ccm} \cdot I_{rif_130} = 7.45569 \cdot 10^3$$

Guasto sulla barra

$$i := \sqrt{-1}$$

$$Z_{eqo_barra} := i \cdot (3 \cdot x_{l2} + x_{og}) + 3 \cdot r_g$$

$$Z_{eqo_barra} = 688 + 0.0656i$$

$$Z_{eqi_barra} := Z_{eqd_barra}$$

$$I_d := \frac{1}{i \cdot Z_{eqd_barra} + i \cdot Z_{eqi_barra} + Z_{eqo_barra}}$$

Nota: la z alla sequenza d e i sono puramente induttive

$$I_d = 1.45349 \cdot 10^{-3} - 3.61909 \cdot 10^{-7} i$$

$$I_{ccm} := 3 \cdot I_d \quad I_{ccm} = 4.36046 \cdot 10^{-3} - 1.08573 \cdot 10^{-6} i$$

$$I_{ccm} \cdot I_{rif_15} = 10.07006 - 2.50738 \cdot 10^{-3} i$$