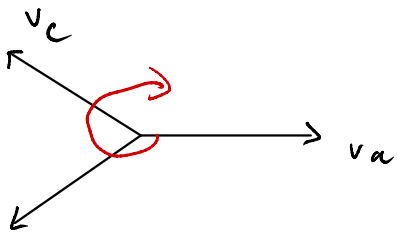
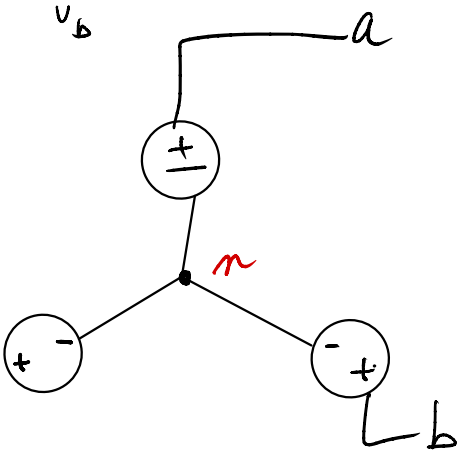


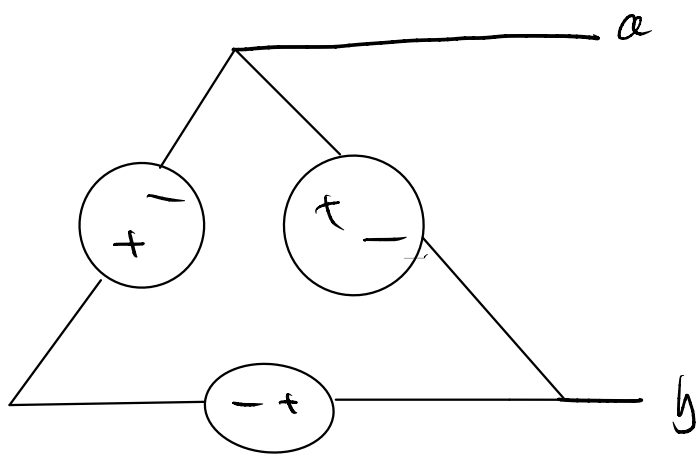
$$V_a = V_m \angle 0^\circ$$

$$V_b = V_m \angle -120^\circ$$

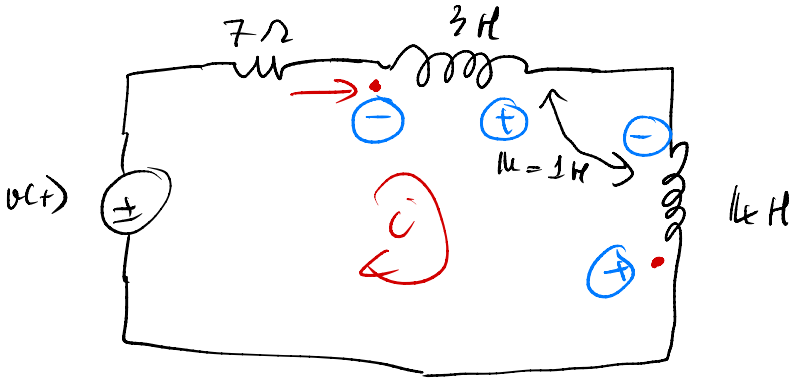
$$V_c = V_m \angle +120^\circ$$



Y - configuration



△ configure



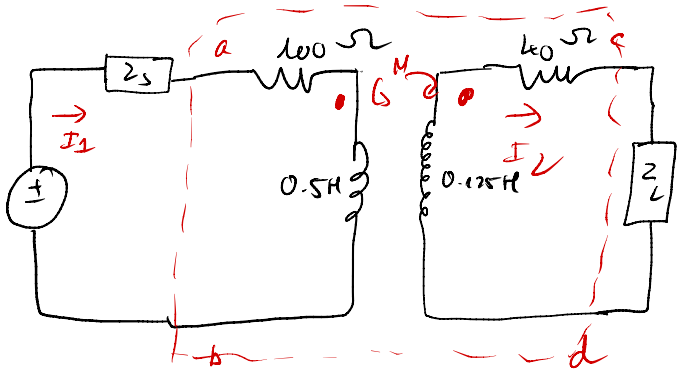
a) KVL: in time domain

$$v(t) + 7i + 3\frac{di}{dt} + 4\frac{di}{dt} - 1\cdot\frac{di}{dt} - 1\frac{di}{dt} = 0$$

b) $v = 10\angle 0$, KVL in phasor form:

$$10\angle 0 + 7I + j3I + j4I - jI - jI = 0$$

c) $-10 + 7I + j5I = 0$



V_s

$Z_L = 360 + 0.25 + 800j = 360 + j200$

$= 800$, $M = 0.4\sqrt{0.5 \times 0.125} = 0.1$

$\omega M = 80$

$Z_{22} = j100 + 40 + 360 + j200$

$= 400 + j300$

$Z_r = \dfrac{(\omega M)^2}{|Z_{22}|^2} \cdot Z_{22}^*$

$= 10.24 - j7.68 \ (\Omega)$

b) $I_1 = ?$

$I_1 = \dfrac{V}{Z_{11} + Z_R} = \dfrac{245.20}{100 + j400 + 184 + Z_R}$

$= 0.5 \angle -53.13^\circ$

$I_2 = \left(\dfrac{j\omega M}{Z_{22}}\right) I_1 = \left(\dfrac{j80}{500 \angle 36.87^\circ}\right) I_1$

$= 0.08 \angle 0^\circ \ (A)$