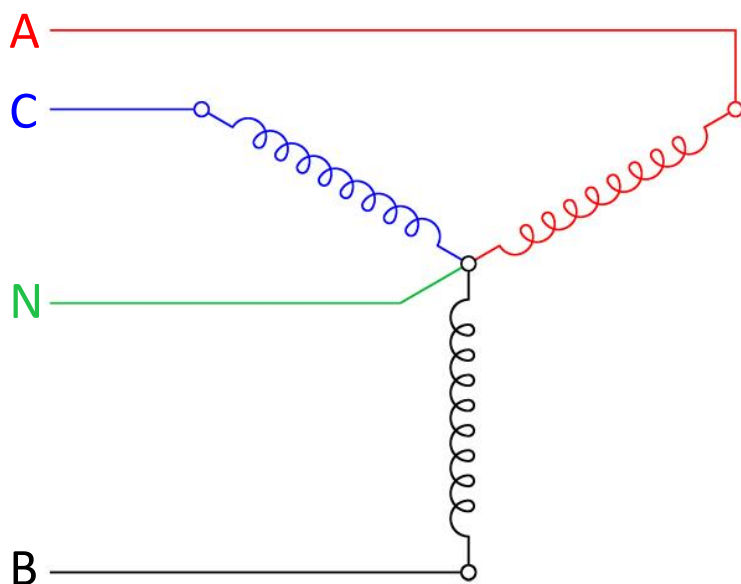


Calculating the Neutral Current on an Unbalanced Non-Unity Power Factor 3 ϕ , 4-wire Wye System

One single-phase motor is connected in each phase of a 3 ϕ , 4-wire system with values indicated below. Calculate the current in the Neutral.



M₁ is connected to V_{AN} and draws 20 A at a 0.866 pf (30°).

M₂ is connected to V_{BN} and draws 15 A at a 0.707 pf (45°).

M₃ is connected to V_{CN} and draws 10 A at a 0.5 pf (60°).

Item	Horizontal	Vertical
M1 = 20 A @ 330° (0° - 30°)	cos(330) x 20 = 17.321	sin(330) x 20 = -10.000
M2 = 15 A @ 195° (240° - 45°)	cos(195) x 15 = -14.489	sin(195) x 15 = -3.882
M3 = 10 A @ 60° (120° - 60°)	cos(60) x 10 = 5.000	sin(90) x 10 = 8.660
Totals:	7.832	-5.222

$$I_N = \sqrt{7.832^2 + -5.222^2}$$

$$I_N = 9.413$$