

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

$$U := 127 \cdot e^{j \cdot 45 \cdot \text{deg}}$$

$$r1 := 30 \quad r2 := 10 \quad r3 := 20 \quad r4 := 10 \quad x1 := 10 \quad x2 := 10$$

$$x3 := 15 \quad x4 := 20$$

$$Z4 := \frac{r4 \cdot j \cdot x4}{r4 + j \cdot x4} = 8 + 4i \quad Z34 := r3 - j \cdot x3 + Z4 = 28 - 11i$$

$$Z2 := r2 + j \cdot x2 = 10 + 10i \quad Z := r1 - j \cdot x1 + \frac{Z2 \cdot Z34}{Z2 + Z34} = 40.138 - 5.26i$$

$$I1 := \frac{U}{Z} = 1.911 + 2.488i$$

Определение модуля и фазы

$$|I1| = 3.137 \quad \arg(I1) = 52.465 \text{ deg} \quad \text{фаза в градусах}$$

$$I2 := I1 \cdot \frac{Z34}{Z34 + Z2} = 2.093 + 1.335i$$

$$|I2| = 2.483 \quad \arg(I2) = 32.525 \text{ deg}$$

$$I3 := I1 - I2 = -0.182 + 1.153i$$

$$|I3| = 1.167 \quad \arg(I3) = 98.973 \text{ deg}$$

$$IL := I3 \cdot \frac{r4}{r4 + j \cdot x4} = 0.425 + 0.303i$$

$$|IL| = 0.522 \quad \arg(IL) = 35.538 \text{ deg}$$

$$Ir := I3 - IL = -0.607 + 0.849i$$

$$|Ir| = 1.044 \quad \arg(Ir) = 125.538 \text{ deg}$$

$$S := U \cdot \overline{I1} = 395.052 - 51.765i$$

$$P := (|I1|)^2 \cdot r1 + (|I2|)^2 \cdot r2 + (|I3|)^2 \cdot r3 + (|Ir|)^2 \cdot r4 = 395.052$$

$$Q := (|I2|)^2 \cdot x2 + (|IL|)^2 \cdot x4 - (|I1|)^2 \cdot x1 - (|I3|)^2 \cdot x3 = -51.765$$

$$Ur1 := |I1| \cdot r1 = 94.117$$

$$Ur3 := |I3| \cdot r3 = 23.343$$

$$Ux1 := |I1| \cdot x1 = 31.372$$

$$Ux3 := |I3| \cdot x3 = 17.507$$

$$Ur2 := |I2| \cdot r2 = 24.828$$

$$U4r := |Ir| \cdot r4 = 10.439$$

$$Ux2 := |I2| \cdot x2 = 24.828$$

$$U4x := |IL| \cdot x4 = 10.439$$