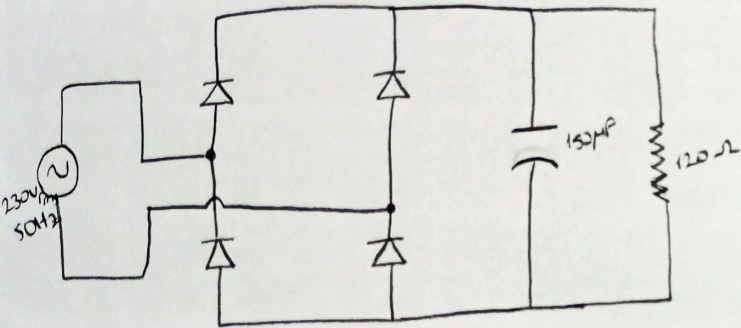


A single-phase uncontrolled full-wave rectifier is supplied by a 230/50 Hz grid. A load with $R = 120 \Omega$ is supplied with a filter capacitor of $C = 150 \mu F$

$$V_m = 325.3$$



Sens ER504
040200434
SMD

$$\theta = \tan^{-1}(-\omega RC) = -\tan^{-1}(\omega RC) + \pi = 99.95^\circ$$

After the cutoff at θ , diodes will start conducting again at $\pi + \alpha$

$$(\sin \theta) e^{-(\pi - \theta)/\omega RC} - \sin \alpha = 0 \quad \alpha \text{ found numerically}$$

$$\pi + \alpha = 204.18^\circ$$

$$V_{avg} = V_m - \frac{\Delta V}{2} \rightarrow \frac{325.3}{2.70 \cdot 120 \cdot 150 \times 10^{-6}} = 180.74$$

$$V_{avg} = 234.95 V$$

$$V_{target} = 0.1 \times 234.95 = 23.5 V$$

$$C_{new} = \frac{V_m}{2f R V_{target}} = \frac{325.3}{2819.4} = 0.1154 F$$