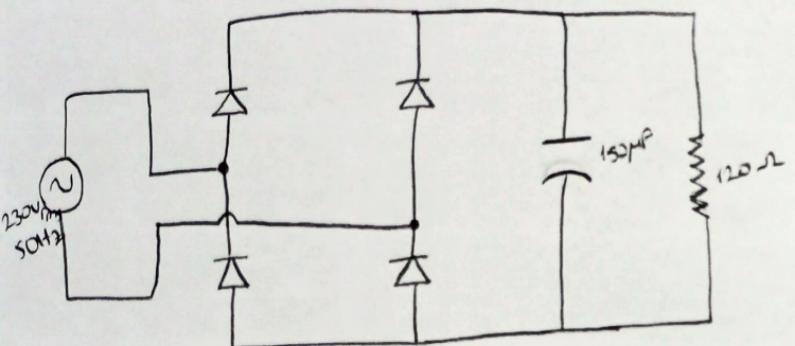


A single-phase uncontrolled full-wave rectifier is supplied by a 230/50 Hz grid. A load with  $R = 120\Omega$  is supplied with a filter capacitor of  $C = 150 \mu F$



$$V_m = 325,3$$

$$\Theta = \tan^{-1}(-wRC) = -\tan^{-1}(wRC) + \pi \\ = 99,95^\circ$$

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

$$(\sin \Theta)e^{-(\pi + \alpha)/wRC} - \sin \alpha = 0 \quad \text{and found numerically}$$

$$\pi + \alpha = 204,18^\circ$$

$$V_{avg} = V_m = \frac{\Delta V}{2} \longrightarrow \frac{325,3}{2 \cdot 0,1 \cdot 120 \cdot 150 \cdot 10^{-6}} = 180,71$$

$$V_{avg} = 234,95 \text{ V}$$

$$V_{target} = 0,1 \times 234,95 = 23,5 \text{ V}$$

$$C_{new} = \frac{V_m}{2fR V_{target}} = \frac{325,3}{2 \cdot 50 \cdot 120 \cdot 23,5} = 0,115 \mu F$$

Sens ERSOY  
060200434  
YMA