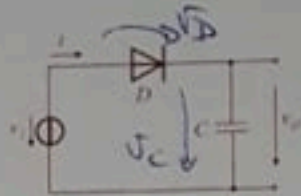


H2 - DC switching circuits

Homework 2 - DC switching circuits



$v_s(t) = 5 \sin 2\pi \cdot 3 \cdot t$ [V][kHz], $C = 330$ nF,
 D - constant voltage drop model, $v_{D, on} = 0.7$ V

- Draw $v_s(t)$, $v_D(t)$ and specify the application of the circuit.
- Connect a resistance R at the output of the circuit. Size R to obtain the maximum value of the output voltage ripple $\Delta v_o = 0.5$ V. Redraw $v_o(t)$.
- Modify the initial circuit to obtain a voltage doubler. Draw $v_o(t)$ for the new circuit.

a) $v_o = v_D + v_C \Rightarrow v_D = v_o - v_C$
 $v_o = v_C$
 $v_D = 5 \sin - 0.7$
 positive peak detector

b) $\Delta v_o = \frac{V_o}{fRC}$; $f = 3 \text{ kHz} \rightarrow R = \frac{V_o}{f \Delta v_o C} = \frac{4.3}{3 \cdot 10^3 \cdot 0.5 \cdot 330 \cdot 10^{-9}} =$
 $= \frac{4.3 \cdot 10^7}{1.5 \cdot 33} = 8.6 \text{ k}\Omega$

c)