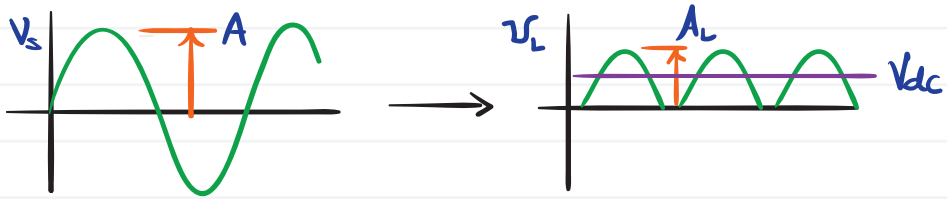
HH 1.20

DC voltage

Source delivers amplitude A across three drops (two diodes and the load/capacitor). Considering amplitudes only,

$$A = 0.6 + 0.6 + A_L \Rightarrow A_L = A - 1.2 .$$



It is roughly true that

$$V_{dc} = \frac{1}{T/2}\int_0^{T/2} A_L \sin\omega t \, dt$$

$$= \frac{2}{\pi} \cdot A_L .$$

If we want $V_{dc} = 10$ V, $A_L = \frac{\pi}{2}(10) = 15.7$ V. Therefore,

$$A = A_L + 1.2 = 16.9 \text{ V}.$$

Ripple voltage

peak-to-peak

We know $\Delta V = \frac{i_L}{2fC}$. We require $\Delta V < 0.1\, V_{pp}$:

$$\frac{i_L}{2fC} < 0.1 \Rightarrow$$

ripple freq. = 2 input freq

$$C > \frac{5 i_L}{f} = \frac{5(10e{-}3)}{(2 \cdot 60)} = 417 \text{ MF}.$$

assume 60Hz line

$$\Rightarrow \quad C > 417 \text{ MF}.$$