

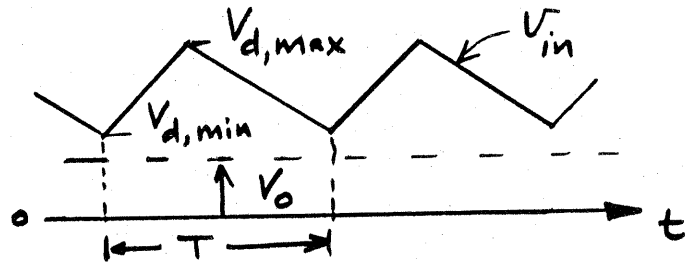
## Problem 1-2

$$V_o = 15V, I_o = \text{Constant}$$

$$V_{d,\min} = 20V, V_{d,\max} = 30V$$

$$P_o = V_o I_o = 15 I_o$$

$$P_{in}(t) = V_{in} I_o ; P_{in}(\text{avg}) = \frac{I_o \int_0^T V_{in}(t) \cdot dt}{T}$$



Graphically:

$$P_{in} = \frac{I_o}{T} \left[ V_{d,\min} \cdot T + \frac{1}{2} T (V_{d,\max} - V_{d,\min}) \right]$$
$$= \frac{1}{2} I_o [V_{d,\min} + V_{d,\max}]$$
$$= 25 I_o$$

$$\therefore \text{efficiency } \eta = \frac{P_o}{P_{in}} = \frac{15}{25} = 0.6.$$