

Special Problem 3.3-26

Homer has constructed a **Piece-Wise Linear model** to approximate the behavior of a certain junction diode (i.e., Homer has determined the values of model parameters V_{D0} and r_D).

Homer constructed his model by simply **guessing** the values of model elements V_{D0} and r_D . In other words, he used **no specific criteria** for selecting these values.

However, we know that Homer's **model** predicts a diode current of:

$$i_D(t) = 6.0 \text{ mA}$$

when a diode voltage of:

$$v_D(t) = 0.68 \text{ V}$$

is placed across it.

Likewise, we know that Homer's **guess** resulted in a model **value** of $V_{D0} = 0.62 \text{ V}$.

Use **Homer's model** to approximately determine the current $i_D(t)$ through the diode if the voltage across it is:

$$v_D(t) = 0.72 + 0.003 \cos \omega t \text{ V}$$