

### Special Problem 3.3 -24

Homer has constructed a **Piece-Wise Linear model** to approximate the behavior of some junction diode.

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  $i_D = 10.0 \text{ mA}$  when a voltage  $v_D = 0.69 \text{ V}$  is placed across it.

Likewise, the **model** predicts a diode voltage of  $v_D = 0.73 \text{ V}$  when a current of  $i_D = 50.0 \text{ mA}$  is flowing through it.

**Use this model** to determine the approximate voltage  $v_D(t)$  across the junction diode if the current through it is:

$$i_D(t) = 30.0 + 2.0 \cos \omega t \quad \text{mA}$$