

**Special Problem 4.7-1**

A strange, two-terminal device has been determined to have the following relationship between the current through it ( $I$ ) and the voltage across it ( $V$ ):

$$V = 3I^2 + 2I^3 - 4.2$$

where  $V$  is in volts and  $I$  in mA.

Using a **small-signal** analysis, determine an **approximate** expression for  $V$  if

$$I = 1 + 0.001 \cos \omega t \text{ mA} .$$

