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Electrical / Electronics Engineering
ENT 281 - Mathematics

$$D = \frac{R}{s^2}$$

$$E = 200V, R = 8\Omega, \frac{dE}{dt} = -5V, \frac{dR}{dt} = 0.2$$

$$\frac{dP}{dt} = \frac{dE}{dt} \cdot \frac{dI}{dt} + P \cdot \frac{dR}{dt}$$

$$\frac{dE}{dt} = \frac{dI}{dt} \cdot R$$
$$\frac{dI}{dt} = \frac{dE}{dt} \cdot \frac{1}{R}$$

$$\frac{dP}{dt} = \frac{dE}{dt} \cdot \frac{dI}{dt} + \left(\frac{E^2}{R^2} \right) \cdot \frac{dR}{dt}$$

$$= \frac{2 \times 200 \times (-5)}{8} + \left(\frac{200^2}{8^2} \right) \times 0.2$$

$$= -250 - 125$$

$$dP = -375W$$