

99. The self-inductance and resistance of the coil may be treated as a “pure” inductor in series with a “pure” resistor, in which case the situation described in the problem is equivalent to that analyzed in §31-9 with solution Eq. 31-43. The derivative of that solution is

$$\frac{di}{dt} = \frac{\mathcal{E}}{R\tau_L} e^{-t/\tau_L} = \frac{\mathcal{E}}{L} e^{-t/\tau_L} \quad .$$

With  $\tau_L = 0.28$  ms (by Eq. 31-44),  $L = 0.050$  H and  $\mathcal{E} = 45$  V, we obtain  $di/dt = 12$  A/s when  $t = 1.2$  ms.