$$\cancel{L} q_0 \left(\frac{R^2}{4L^{\cancel{2}}} - \frac{1}{\cancel{L}C} - \frac{R}{2\cancel{L}}\right) + R\left(-\frac{q_0 R}{2L}\right) + \frac{q_0}{C} = \emptyset$$

$$\emptyset = q_0\left\{\left(\frac{R^2}{4L} - \frac{1}{\cancel{C}} - \frac{R}{2} - \frac{R^2}{2L} + \frac{1}{\cancel{C}}\right) = \left(\frac{R^2}{4L} - \frac{R}{2} - \frac{R^2}{2L}\right.\right.$$

$$\emptyset = \cancel{q_0} R\left\{\frac{R}{4L} - \frac{R}{2L} - \frac{1}{2}\right\} = \frac{\cancel{q_0}R}{2}\left\{\frac{1}{2}\frac{R}{L} - \frac{R}{L} - 1\right\}$$

$$\frac{R}{2L} - \frac{R}{L} = 1$$

$$\frac{R}{2} - R = L$$

$$-\frac{R}{2} = L$$

$R = -2L = -10\,H$ ← this doesn't make sense unit-wise

$$f(R) = e^{-\frac{Rt}{2L}} \cos\left(\sqrt{\frac{1}{LC} - \left(\frac{R}{2L}\right)^2}\, t\right) - \frac{q}{q_0}$$

$L = 5H$, $C = 10^{-4} F$, $\frac{q}{q_0} = 0{,}01$, $t = 0{,}05$

$a = \frac{t}{2L}$ $\quad b = \frac{1}{4L^2}$ $\quad d = \frac{1}{LC}$

$$f(R) = e^{-aR} \cos\left(\sqrt{d - bR^2}\, t\right) - \frac{q}{q_0}$$

$$f'(R) = -ae^{-aR} \cos\left(\sqrt{d - bR^2}\, t\right) + \frac{bRt}{\sqrt{d-bR^2}}\, e^{-aR} \sin\left(\sqrt{d-bR^2}\, t\right)$$

$$\left\{ \frac{d}{dR} \cos\left(\sqrt{d-bR^2}\, t\right) = \cancel{+}\sin\left(\sqrt{d-bR^2}\, t\right)\left(\frac{\cancel{1}}{\cancel{2}}t\,(d-bR^2)^{-\frac{1}{2}}\right)(\cancel{+}\cancel{2}bR)\right.$$

$$\left. = \frac{bRt}{\sqrt{d-bR^2}} \sin\left(\sqrt{d-bR^2}\, t\right)\right\}$$