

$$\frac{di}{dt} = \frac{1}{T} \left(\frac{U_q}{R} - i \right)$$

$$\int \frac{di}{\left(\frac{U_q}{R} - i \right)} = \int -\frac{dt}{T}$$

$$\ln \left(i - \frac{U_q}{R} \right) = -\frac{t}{T} + \ln K$$

$$i - \frac{U_q}{R} = K \cdot e^{-\frac{t}{T}}$$

$$i = \frac{U_q}{R} + K \cdot e^{-\frac{t}{T}}$$

$$i(0) = 0 = \frac{U_q}{R} + K \quad \leadsto \quad K = -\frac{U_q}{R}$$

$$i(t) = \frac{U_q}{R} - \frac{U_q}{R} \cdot e^{-\frac{t}{T}}$$

$$i(t) = \frac{U_q}{R} \left(1 - e^{-\frac{t}{T}} \right)$$

$$u_L = L \frac{di}{dt} = L \left[-\frac{U_q}{R} \cdot e^{-\frac{t}{T}} \cdot \left(-\frac{R}{L} \right) \right]$$

$$u_L = U_q \cdot e^{-\frac{t}{T}}$$

