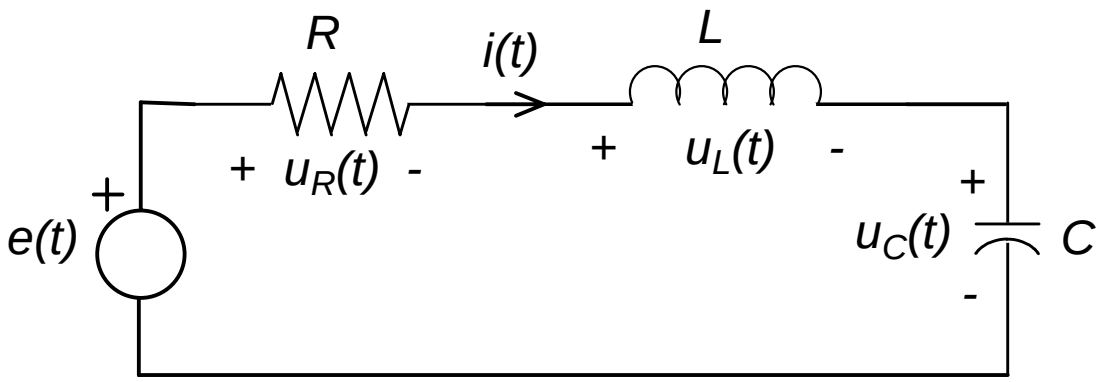
Lasse Alfredsson

Differentialekvation -
Signaler & System

Ex, Elektrisk krets:



Beräkna i(t) !

$$i(t) = C \cdot \frac{du_C(t)}{dt}$$

$$u_R(t) = R \cdot i(t)$$

$$u_L(t) = L \cdot \frac{di(t)}{dt}$$

ALLTSÅ:

$$i(t) = C \cdot \frac{du_C(t)}{dt}, \qquad \text{där} \quad u_C(t) = e(t) - u_R(t) - u_L(t)$$

$$\Rightarrow \quad i(t) = C \cdot \frac{de(t)}{dt} - RC \cdot \frac{di(t)}{dt} - LC \cdot \frac{di^2(t)}{dt^2}$$

$$\boxed{\Rightarrow \quad \frac{di^2(t)}{dt^2} + \frac{R}{L} \cdot \frac{di(t)}{dt} + \frac{1}{LC} \cdot i(t) = \frac{1}{L} \cdot \frac{de(t)}{dt}}$$