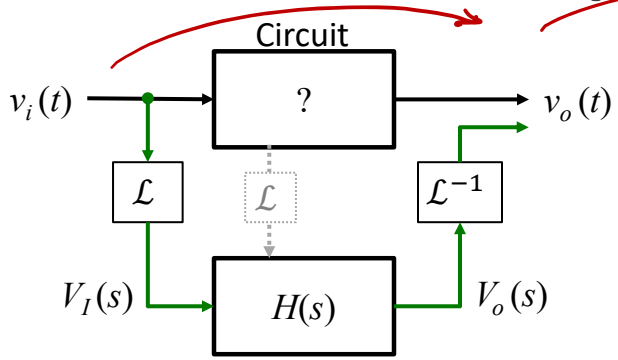
System I/O Relationship



201 approach → solve Diff EQs

$\mathcal{L}\{v_i(t)\} = V_I(s)$

Take the Laplace transform of the circuit & solve it to get $H(s)$

$V_o(s) = H(s)\,V_I(s)$

$v_o(t) = \mathcal{L}^{-1}\{V_o(s)\}$

$v_o(t) = \mathcal{L}^{-1}\{V_I(s)\,H(s)\}$

what is $\mathcal{L}^{-1}\{H(s)\}$?

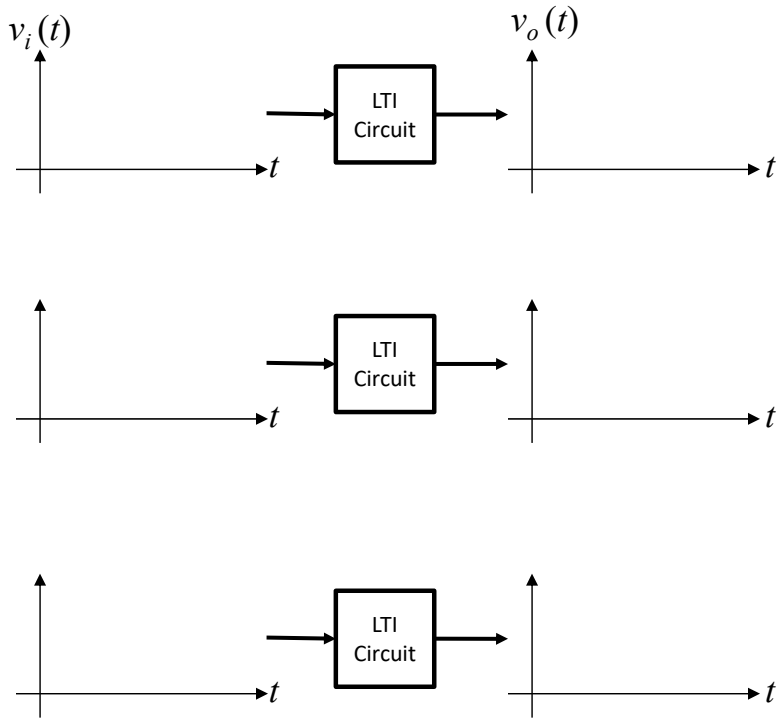
Look at what happens if the $V_o(s) = H(s)\,(1)$ &

$h(t)$ → impulse response of circuit

$v_i(t) = \delta(t)$? → $\mathcal{L}\{\delta(t)\} = 1$

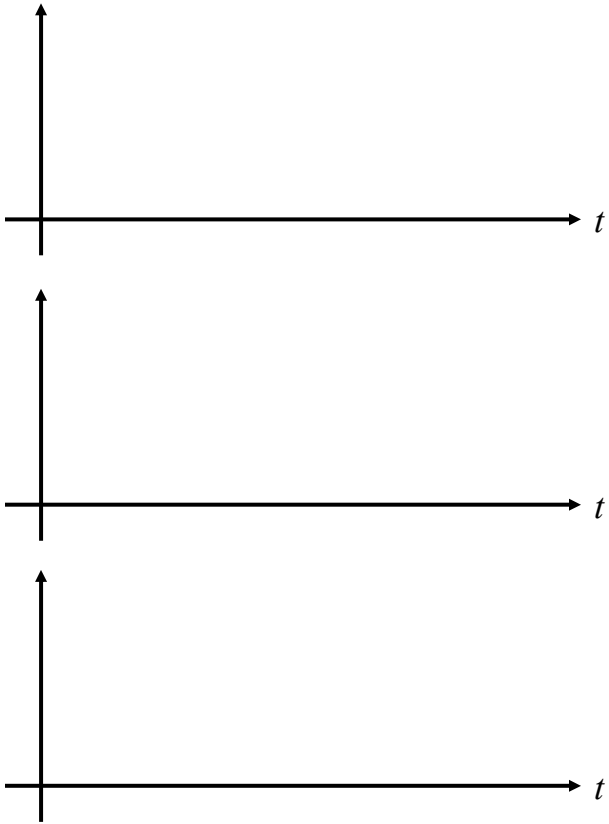
$v_o(t) = h(t)$

Convolution



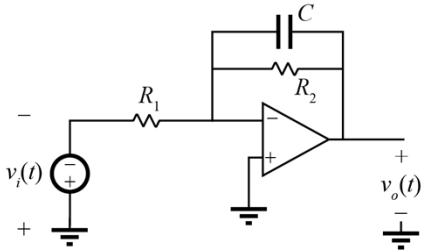
The Convolution Integral

Graphical Convolution



https://lpsa.swarthmore.edu/Convolution/CI.html
https://phiresky.github.io/convolution-demo/

Example Problem



Example Problem