(1) Find the complex frequency / Don't use Laplace transform

→ $v(t) = 5\ V$ → DC

$s = 0 + j0 = 0$, $V(s) = 5$

→ $v(t) = 5e^{-3t}\ V$ → exponential

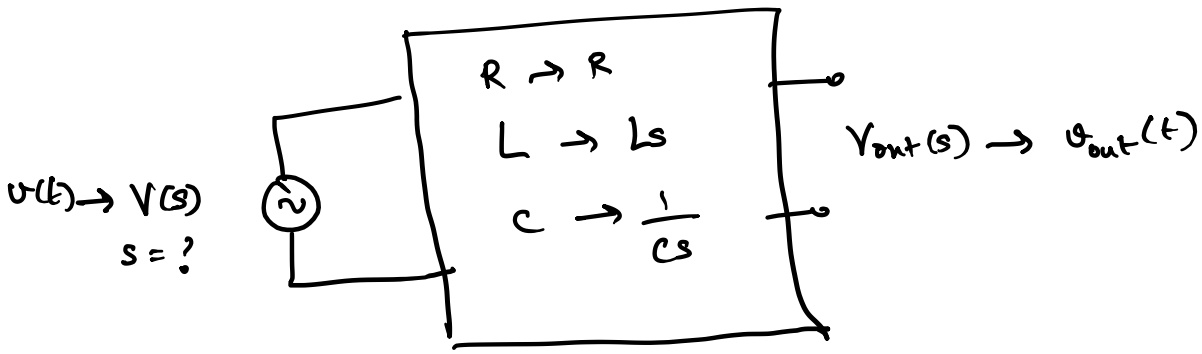
$s = -3 + j0$, $V(s) = 5$

→ $v(t) = 5\cos(3t + 45°)\ V$ → AC / sinusoidal

$s = 0 \pm j3$, $V(s) = 5\angle 45° = 5e^{j45°} = 5(\cos 45° + j\sin 45°)$

→ $v(t) = 5e^{-2t}\cos(3t + 45°)\ V$ → Decaying & sinusoidal

$s = -2 \pm j3$, $V(s) = 5\angle 45°$



For these source excitations, you don't need Laplace transform

(1)

When to use Laplace Transform

$v(t) = e^{-3t}u(t)$

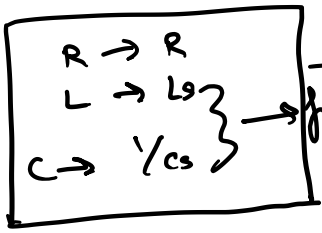
$v(t) = \delta(t-3)$

$v(t) = te^{-2t}u(t)$

} we can't find s

s remains a variable

$v(t) \xrightarrow{LT} V(s)$ (function of s)



$V_{out}(s) \xrightarrow{ILT} v(t)$ (function of s)

look up table or not $\int$