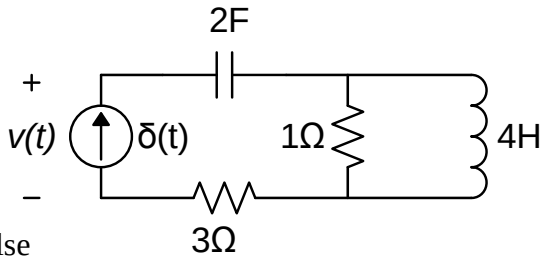
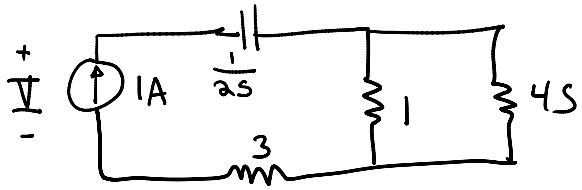
Concept: Impulse Response

Find: Find the impulse response (the circuit's response to an impulse input) of the circuit.

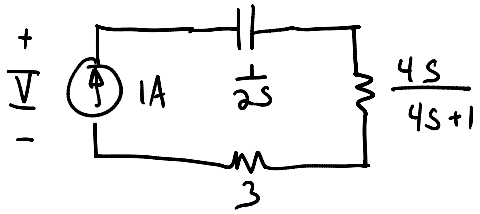


Hint: The solution has both a step and impulse

Freq Domain



$1 \| 4s = \frac{4s}{4s+1}$



$V = I \cdot Z$

$= 1\left(\frac{1}{2s} + \frac{4s}{4s+1} + 3\right)$

Don't put over common den – you just have to split it out to find inverse transform!

$= \frac{1}{2s} + \frac{s}{s+1/4} + 3$

improper → $s + 1/4 \overline{)\, s}$ quotient 1, $-(s+1/4)$, remainder $-1/4$

$= \frac{1}{2s} + \left(1 - \frac{1/4}{s+1/4}\right) + 3$

$= \frac{1}{2s} - \frac{1/4}{s+1/4} + 4$ Now reap the benefits of not putting over a common den

$\Rightarrow \boxed{\left[\frac{1}{2} - \frac{1}{4}e^{-\frac{1}{4}t}\right] u(t) + 4\,\delta(t)}$