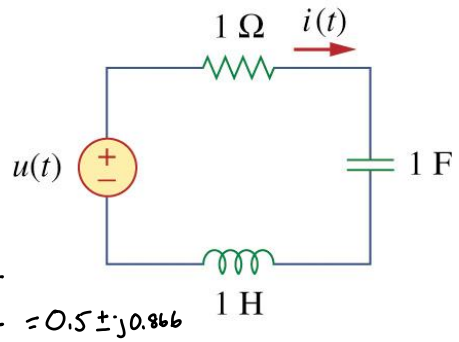
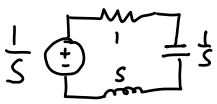
P1 Use Laplace Transforms to find $i(t)$.
Note: NOT $I(s)$ but $i(t)$.





$\Rightarrow I(s) = \frac{V(s)}{Z(s)}$

$I(s) = \frac{\frac{1}{s}}{1+\frac{1}{s}+s} = \frac{1}{s^2+s+1}$ poles $s = \frac{-1 \pm \sqrt{1-4}}{2}$

$= -\frac{1}{2} \pm \frac{j\sqrt{3}}{2} = 0.5 \pm j0.866$

$= \frac{1}{(s+\frac{1}{2}-j\frac{\sqrt{3}}{2})(s+\frac{1}{2}+j\frac{\sqrt{3}}{2})}$

$= \frac{A}{s+\frac{1}{2}-j\frac{\sqrt{3}}{2}} + \frac{A^*}{s+\frac{1}{2}+j\frac{\sqrt{3}}{2}}$ $\quad A = \frac{1}{(-\frac{1}{2}+j\frac{\sqrt{3}}{2})+\frac{1}{2}+j\frac{\sqrt{3}}{2}} = \frac{1}{j\sqrt{3}} = 0.577\angle -90^\circ$

$\times 2 = 1.15$

$i(t) = 1.15\, e^{-\frac{1}{2}t} \cos(0.866t - 90^\circ)$ A