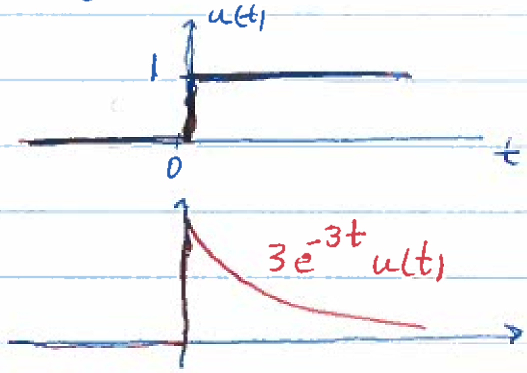
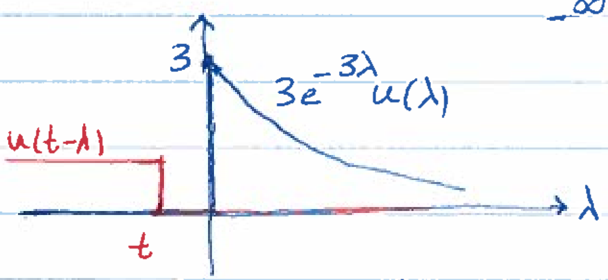
The University of Texas at Austin

Notes by Mr. Houshang Salimian

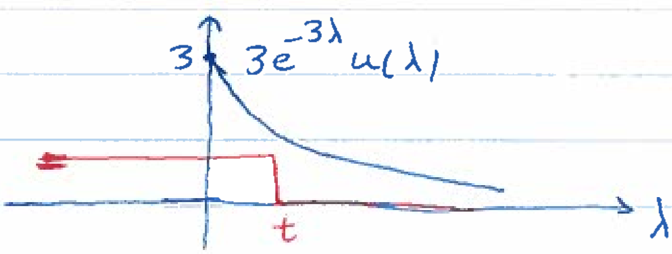
HW 8.3



$$(3e^{-3t}u(t)) * u(t) = \int_{-\infty}^{\infty} (3e^{-3\lambda}u(\lambda))\, u(t-\lambda)\, d\lambda$$



Case I: No overlap

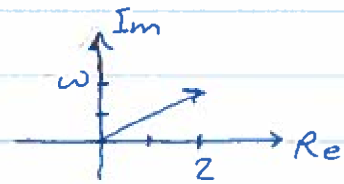


Case II: Partial / Complete Overlap

$$3e^{-3t}u(t) * u(t) = \begin{cases} 0 & \text{for } t \leq 0 \quad \text{case I} \\ \int_0^t 3e^{-3\lambda}\, d\lambda & \text{for } t > 0 \quad \text{case II} \end{cases}$$

Lecture Slide 14-5

$$\lim_{t\to\infty} \frac{2e^{(-2-j\omega)t}}{-2-j\omega} = \frac{1}{-2-j\omega} \lim_{t\to\infty} 2\,\cancel{e^{-2t}}^{\,\to 0}\, \underbrace{e^{-j\omega t}}_{\text{Oscillates}}$$



$$\frac{Z_1}{Z_2} = \frac{r_1 e^{j\varphi_1}}{r_2 e^{j\varphi_2}} = \underbrace{\frac{r_1}{r_2}}_{\text{magnitude}}\, e^{j\overbrace{(\varphi_1-\varphi_2)}^{}}\quad \text{phase}$$

$$\frac{2}{2+j\omega}\cdot\frac{2}{2-j\omega} = \frac{4-2j\omega}{4+2j\omega-2j\omega+\omega^2} = \frac{4-2j\omega}{4+\omega^2}$$

$$H(j\omega) = \frac{2}{2+j\omega} \longrightarrow |H(j\omega)| = \left|\frac{2}{2+j\omega}\right| = \frac{|2|}{|2+j\omega|}$$

$$\longrightarrow |H(j\omega)| = \frac{2}{\sqrt{2^2+\omega^2}}$$