EE 2000 Assignment # 12

(taken from Dr. Jingxian Wu, University of Arkansas, 2020.)

1. The Laplace transoform of a causal signal $x(t)$ is

$$X(s) = \frac{s+5}{s^2+3s+2}, \quad \text{Re}(s) > -1 \tag{1}$$

Using the properties of Laplace transform, find the Laplace transform of the following signals

(a) $3x(t/3)$

(b) $x(t-2)$

(c) $(t-1)x(t)$.

(d) $\frac{dx(t)}{dt}$.

(e) $x(t)\exp(-2t)$.

(f) $x(t)\cos(2t)$ (don't need to simplify)

2. Determine the initial value and final value of the signal whose Laplace transform is $X(s) = \frac{s+2}{s^2-2s-3}$.

3. Solve the following differential equation:

$$y''(t) + 4y'(t) + 3y(t) = \exp(-2t)u(t), y(0^-) = 0, y'(0^-) = 1 \tag{2}$$