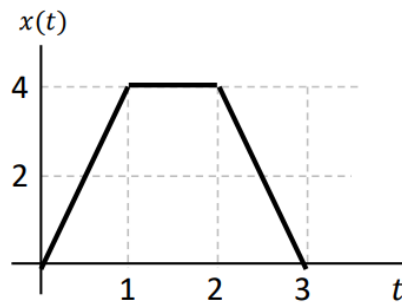


Discussion 4
ECE 102: Systems and Signals
Winter 2022

Instructor: Prof. Danijela Cabric

1. Laplace Transform 1

Compute the Laplace Transform of $x(t)$ and find its ROC.



2. Laplace Transform 2

Find the Laplace transform of the following functions

- (a) $x(t) = t^2 e^{-t} u(t)$
- (b) $x(t) = t \sin(3t) u(t)$
- (c) $x(t) = e^{2t} u(-t) + e^{3t} u(-t)$

3. Pole zero plots

For the following transfer function $H(s)$:

$$H(s) = \frac{3s^2 + 2s + 1}{s^2(s + 1)}, \text{Re}\{s\} > 0$$

- (a) Sketch pole-zero plot of $H(s)$.
- (b) Is the system BIBO stable? How do we know?
- (c) Find $h(t)$ by taking inverse Laplace transform of $H(s)$.