- 1. Determine the unilateral Laplace transform of the following signals: (a) $x(t) = e^{-2t} u(t-1)$
 - (b) x(t) = (u(t-1) u(t-2))
 - (c) x(t)= sin(100 t) u(t)
 - (d) x(t) = t (u(t) u(t-1))
- 2. Determine the causal inverse of the following Laplace transformations:

(a)
$$X(s) = \frac{1}{s^2 + 5s + 6}$$
, $ROC: \mathcal{R}e[s] > -3$
(b) $X(s) = \frac{s^2 + 2}{s^2 + 4}$, $ROC:$ whole s plane

3. Is it possible to compute the transfer function and impulse response for the systems defined by the following differential equations? Derive the formula for each if possible.

(a)
$$y''(t) + y'(t) - 2y(t) = 2x'(t) + x(t)$$
, with $y(0) = 0, y'(0) = 0, x(0) = 1$
(b) $y'''(t) + 2y''(t) + 3y(t) = x(t)$, with $y(0) = y'(0) = 0$

- Assigned: Tuesday June 16, 2015
- Deadline: Sunday June 21, 2015