Signals and Systems HW8
Deadline: 2019/05/31 before 18:30
(You should submit hand-writing paper to BL B1 EE student office.)

1. Given the following conditions of a continuous-time LTI system:
   - The system function is rational and has only two poles at $s = -1$, $s = 3$;
   - If $x(t) = 1$, then $y(t) = 0$.

   (a) (10%) Determine the region of convergence of the system for all cases.
   (b) (10%) Is the system causal? Justify your answer.
   (c) (10%) Is the system stable? Justify your answer.

2. Determine $X(s)$ and its ROC based on the following descriptions about a real signal $x(t)$: (40%)
   - $X(0) = 4$
   - $X(s)$ has exactly two poles
   - $X(s)$ has no zeros in the finite s-plane
   - $X(s)$ has a pole at $s = j2$
   - $e^{3t}x(t)$ is absolutely integrable

3. Determine differential equation descriptions and sketch block diagram representations using parallel form systems with the following transfer functions:

   (a) (15%) $H(s) = \dfrac{1}{s(s+3)}$

   (b) (15%) $H(s) = \dfrac{2(s-2)}{(s+1)^2(s+3)}$