ECE355: Signals and Systems

Homework #3 **Due day: 02/29/2024**

1. Using direct integration to calculate the following convolutions (Don't use the convolution table):

   1). $e^{-at}u(t) * e^{-bt}u(t)$

   2). $tu(t) * u(t)$

2. Please use the **convolution table** to calculate following convolutions:

   1). $e^{-2t}u(t) * (1 - e^{-t})u(t)$

   2). $[\cos(5t) - e^{-t}]u(t) * \delta(2 - t)$

   3). $e^{-(t-3)}u(t-3) * [e^{-2(t-1)} - e^{-(t-1)}]u(t-1)$

3. The unit impulse response of an LTIC system is $h(t) = e^{-t}u(t)$. Please use the **convolution table** to find the zero-state response *y(t)* if the input is:

1). $x(t) = \delta(t-5)$;

2). $x(t) = (t+4)u(t+4)$;

3). $x(t) = e^{-2(t-1)}u(t-1) + \sin(3t)u(t)$