

1. **(10 pts Total)** A continuous-time LTI system has impulse response $h(t) = -t[u(t) - u(t - 8)]$.
 - (a) **(1 pts)** Is this system memoryless?
 - (b) **(2 pts)** Is this system causal? Explain why or why not.
 - (c) **(2 pts)** Is this system BIBO stable? Explain why or why not.
 - (d) **(5 pts)** What is the output of the system when the input is $x(t) = [u(t) - u(t - 8)]$?
2. **(10 pts Total)** A causal LTI system is described by the linear constant coefficient difference equation:

$$y[n] - 0.9y[n - 1] = x[n] + 0.5x[n - 1],$$

where $y[n] = 0$ for $n < 0$.

- (a) **(3 pts)** Determine the impulse response, $h[n]$, of this system.
- (b) **(2 pts)** Is this system BIBO stable? Explain why or why not.
- (c) **(5 pts)** Solve the difference equation when $x[n] = u[n] - u[n - 2]$.