ECE 355: Signals and Systems

Homework#1 **Due day: 02/06/2024**

1. Please determine whether the following signals are even, odd, or neither even nor odd signals (Detailed calculations are needed).

   (1). $f(t) = \frac{1}{t}$

   (2). $f(t) = \frac{1}{1+t^3}$

   (3). $f(t) = \cos 2\pi t + \cos(10\pi t)$

2. Please find the even and the odd parts of the following signals.

   (1). $f(t) = e^{-jt}$

   (2). $f(t) = \sin \omega_0 t$

   (3). $f(t) = t^3 - 2t^2 + 5$

3. Please determine whether the following systems are linear or not (Detailed calculation steps are needed).

(1). $y = e^{-5x}$

(2). $y = 5x^3 - x$

4. Please determine whether the following systems are time-invariant or time-varying system (Detailedcalculation steps are needed).

(1). $y(t) = 5e^{3x(t)}$

(2). $y(t) = tx(t)^3 - x(t)$