EE3210 Signals and Systems

Tutorial 11

Problem 1: Consider a continuous-time LTI system that is characterized by the differential equation

$$\frac{d^2y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t).$$

Use frequency-domain analysis to determine the response of the system $y(t)$ when the input is

$$x(t) = e^{-t}u(t).$$

Problem 2: Consider a discrete-time LTI system that is characterized by the difference equation

$$y[n] - \frac{3}{4}y[n-1] + \frac{1}{8}y[n-2] = 2x[n].$$

Use frequency-domain analysis to determine the response of the system $y[n]$ when the input is

$$x[n] = \left(\frac{1}{4}\right)^n u[n].$$