

ECE 343 - Homework #7

Solving differential equations with periodic inputs - Summer 2018

Let $x(t)$ be a 1 rad/sec square wave

$$x(t) = x(t + 2\pi)$$

$$x(t) = \begin{cases} 1 & 0 < t < \pi \\ 0 & \pi < t < 2\pi \end{cases}$$

1) Find $y(t)$ assuming x and y are related by the following differential equation

$$\frac{d^2y}{dt^2} + 3\frac{dy}{dt} + 2y = 4x$$

Approximate x and y using Fourier transforms taken out to 20 harmonics ($n = 1..20$)

2) Find $y(t)$ assuming x and y are related by the following differential equation

$$\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 17y = 17x$$

Approximate x and y using Fourier transforms taken out to 20 harmonics ($n = 1..20$)