

Homework #5

You must justify all steps to get credit for your work

Please submit the HW via CASA or email your completed assignment as a single PDF file to jshi24@CougarNet.UH.EDU.

(1)[4Pts] Consider the following linear differential equation

$$y''' + y = 0$$

(a) Find the general solution of the following differential equation

(b) Solve the IVP where $y(0) = 0, y'(0) = 1, y''(0) = 0$

(2)[3Pts] Use the method of variation of parameters to compute a particular solution of the following linear differential equation

$$y''' - y' = x$$

(3)[4Pts] Use the method of variation of parameters to compute a particular solution of the following linear differential equation (note that $r = 1$ is a root of the characteristic polynomial)

$$y^{(4)} - 4y^{(3)} + 6y'' - 4y' + y = e^x$$

(4)[4Pts] Find the general solution of the following non-homogeneous differential equation

$$y''' + y'' + y' = x$$

(5)[5Pts] Find the solution of the following IVP modeling undamped forced harmonic motion

$$y'' + 4y = \sin(2x), \quad y(0) = 3/4, y'(0) = 2$$

Please, write the solution using sinusoidal functions with amplitude and phase as in Lecture 13.