

Homework #4

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)[5Pts] Consider the following linear second order differential equation

$$xy'' - (x + 1)y' - y = 0, \quad x > 0$$

(a) Show that $y_1 = e^x$ and $y_2 = x + 1$ are solutions of the differential equation above.

(b) Use the method of variation of parameters to find a particular solution of

$$xy'' - (x + 1)y' - y = x^2 e^{2x}, \quad x > 0$$

(c) Write the general solution of the non-homogeneous equation in part (b)

(2)[4Pts] Find the general solution of the following differential equation

$$y'' - 3y' + 2y = x^2$$

(3)[4Pts] Find the general solution of the following differential equation

$$y'' - y' - 2y = e^{-x} + x^2 + \cos(x)$$

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

$$y'' - 4y = 3e^{2x} + 4e^{-x}$$

(5)[3Pts] Give the form of a particular solution for

$$y'' - 4y' + 5y = 1 + x^2 + e^{2x} \cos x$$