

HOMEWORK 9

1. Find the interval of existence for the following IVPs

(a) $t^2 y'' + ty' + 6y = 0, y(-1) = 2, y'(-1) = 3$

(b) $y'' - \cot ty' + (\ln t)y = e^{5t}, y(1) = 0, y'(1) = 2$

2. Find out if the following functions are linear dependent or independent

(a) $y_1 = e^{2t} \sin t, y_2 = e^{2t} \cos t$

(b) $y_1 = e^{3t}, y_2 = te^{3t}$

3. Find the general solution to the following ODEs

(a) $y'' - 7y' + 12y = 0$

(b) $y'' - 5y' - 6y = 0$

(c) $y'' + 10y' + 23y = 0$

4. Find the solution to the following IVP and determine the long term behavior. (Hint: look at where the limit goes)

(a) $y'' - 25y = 0, y(0) = 3, y'(0) = -9$

(b) $y'' - y' = 0, y(0) = 3, y'(0) = 2$

(c) $6y'' + 5y' - 4y = 0, y(0) = 0, y'(0) = 0$