

HOMEWORK ASSIGNMENT 3

(Due Thursday February 7, 2008 in class)

(1) Solve the following differential equations:

(a) $y''(e^x + 1) + y' = 0$,

(b) $yy'' = (y')^2 - (y')^3$,

(c) $(y'')^2 + y' = xy''$,

(d) $y'' + (y')^2 = 2e^{-y}$,

(e) $y'' - xy''' + (y''')^3 = 0$,

(f) $2y'(y'' + 2) = x(y'')^2$,

(g) $(y'')^2 - 2y'y''' + 1 = 0$

(2) Solve the general solution of the following differential equations:

(a) $y'' + y' - 2y = 0$,

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

(c) $y'' + 2y' + 10y = 0$,

(d) $y'' + 4y = 0$,

(e) $y'' - 2y' + y = 0$,

(f) $y'' + y = 4xe^x$,

(g) $y'' - y = 2e^x - x^2$,

(h) $y'' + y' - 2y = 3xe^x$,

(i) $y'' + y = 4 \sin x$,

(j) $y'' - 5y' + 4y = 4x^2e^{2x}$,

(k) $y'' - 5y' = 3x^2 + \sin 5x$

(3) Find a linear differential equation of the second order with constant coefficients, having the function $y_1(x) = e^{2x} \cos x$ as a solution

(4) Under what conditions on a and b , all solutions to the differential equation $y'' + ay' + by = 0$ are bounded for all $-\infty < x < \infty$?