Indian Institute of Space Science and Technology

Thiruvananthapuram

B.Tech semester 2

MA121 - Ordinary Differential Equations

Assignment-I
(Submission Date: on or before 20/5/2023)

1. Find the general solution of
   (a) $y' + \frac{y}{x^2} = 2xe^{1/x}$
   (b) $y' + 3y = sin\ x$
2. Find a basis for solutions
   (a) $y'' + 2ky' + k^2y = 0$ given $y_1(x) = e^{-2x}$
   (b) $x^2y'' + xy' - 4y = 0$ given $y_1(x) = x^2$
3. Find the general solution of
   (a) $y^{(v)} - 7y''' + 12y' = 0$
   (b) $y^{(iv)} - 8y''' + 26y'' - 40y' + 25y = 0$
   (c) $16y^{(iv)} - 8y'' + y = 0$
4. Find the general solution of
   (a) $y^3 + y' = 2x^2 + 4sin\ x$
   (b) $y^5 + 2y''' + +y' = 2x + sin\ x + cos\ x$
5. solve $y''' - 6y'' + 9y' - 4y + 8x^2 + 3 - 6e^{2x}$ with $y(0) = 1$, $y'(0) = 7$, $y''(0) = 10$.
6. Find the general solution of
   (a) $y'' + a^2y = sec\ ax$
   (b) $y''' + 3y'' + 3y' + y = 2e^{-x} - x^2e^{-x}$
   (c) $y^{(iv)} - 16y = x^2sin\ 2x + x^4e^{2x}$
7. Solve $y'' - 2y' + y = 2xe^{2x} + 6x^2$ with $y(0) = 1, \quad y'(0) = 0.$
8. Find general solution of
   (a) $x^3y'''x^2y'' + 2xy' - 2y = x^3$
   (b) $x^3y''' - 3x^2y'' + 6xy' - 6y = 0$
9. Solve by power series method
   (a) $y'' - (1 + x)y' + x^2y = x$ with $y(0) = 1, \ y'(0) = 1.$
   (b) $y'' - xy' + y = 0$
10. Solve by Frobenius method
    (a) $9x(1 + x)y'' - 6y' + 2y$=0, about x_0=0
    (b) $xy'' - y$=0