

Math 217 - September 30, 2010

- n th order linear equations

1. Given that $y_p = x/2 + 3/4$, find the general solution

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

2. Given that $y_p = 4\sin x - \cos x$, find the general solution

$$y'' + 4y = 17\cos x$$

3. Find a general solution to the differential equation.

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

4. Find a general solution to the differential equation.

$$y''' - y'' - 2y' = 0$$

5. Find a general solution to the differential equation.

$$y''' - 4y'' + 4y' = 0$$

6. Find a general solution to the differential equation.

$$y''' - 2y'' = 0$$

7. Did you use the Wronskian in the previous problems to make sure your individual solutions were linearly independent?

Lecture Problems

8. Given the factorization, find a general solution to the differential equation.

$$\begin{aligned} r^5 - 15r^4 + 85r^3 - 225r^2 + 274r - 120 &= (r-1)(r-2)(r-3)(r-4)(r-5) \\ y^{(5)} - 15y^{(4)} + 85y^{(3)} - 225y'' + 274y' - 120y &= 0 \end{aligned}$$

9. Given the factorization, find a general solution to the differential equation.

$$\begin{aligned} r^4 - 8r^3 + 21r^2 - 22r + 8 &= (r-1)^2(r-4)(r-2) \\ y^{(4)} - 8y^{(3)} + 21y'' - 22y' + 8y &= 0 \end{aligned}$$

10. Given the factorization, find a general solution to the differential equation.

$$\begin{aligned} r^5 - r^4 - 6r^3 + 14r^2 - 11r + 3 &= (r-1)^4(r+3) \\ y^{(5)} - y^{(4)} - 6y^{(3)} + 14y'' - 11y' + 3y &= 0 \end{aligned}$$

11. Given the factorization, find a general solution to the differential equation.

$$\begin{aligned} r^6 + r^5 - 5r^4 - r^3 + 8r^2 - 4r &= r(r-1)^2(r+2)^2 \\ y^{(6)} + y^{(5)} - 5y^{(4)} - y^{(3)} + 8y'' - 4y' &= 0 \end{aligned}$$