

Second Order Linear Differential Equations- HW Problems

1. Verify that $y_1 = e^x$ and $y_2 = xe^x$ are solutions of $y'' - 2y' + y = 0$. Show that y_1 and y_2 are linearly independent and find a particular solution to the differential equation, y , such that $y(0) = 2$ and $y'(0) = 5$.

In problem 2 and 3 determine if the functions are linearly independent.

2. $f(x) = e^x \cos(x)$, $g(x) = e^x \sin(x)$

3. $f(x) = 1 + \cos(2x)$, $g(x) = \cos^2(x)$.

In problems 4-7 find the general solution to the given differential equation.

4. $y'' - 4y = 0$

5. $y'' + y' - 2y = 0$

6. $y'' - 8y' + 16y = 0$

7. $4y'' - 12y' + 9y = 0$.

In problems 8 and 9 find the particular solutions to the initial value problems.

8. $y'' - y' - 6y = 0$; $y(0) = 6$, $y'(0) = 8$

9. $y'' - 6y' + 9y = 0$; $y(0) = 4$, $y'(0) = 9$.