

Math 217 - September 27, 2010

Solutions

- 2nd order linear
- Linear combinations and linear independent functions
- Wronskian

1. Solve for c_1 and c_2 :

$$\begin{aligned}c_1 + c_2 &= 1 \\ 2c_1 - 2c_2 &= 2\end{aligned}$$

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$$\begin{aligned}c_1 + c_2 &= 1 \\ 2c_1 + 2c_2 &= 2\end{aligned}$$

3. Solve for c_1 and c_2 :

$$\begin{aligned}c_1 + c_2 &= 2 \\ 2c_1 - 3c_2 &= -1\end{aligned}$$

4. Suppose $y = c_1e^{2x} + c_2e^{-2x}$ and $y(0) = 1$ and $y'(0) = 2$. Find c_1 and c_2 .

5. Suppose $y = c_1x^2 + c_2x^{-3}$ and $y(1) = 2$ and $y'(1) = -1$. Find c_1 and c_2 .

6. Given that $\cosh x = \frac{1}{2}(e^x + e^{-x})$ and $\sinh x = \frac{1}{2}(e^x - e^{-x})$. Find the derivatives $\frac{d}{dx} \sinh x = \cosh x$ and $\frac{d}{dx} \cosh x = \sinh x$.

Lecture Problems

7. Determine if the functions $\{e^x, e^{2x}\}$ are linearly independent by using the Wronskian. **Solution:** $W(e^x, e^{2x}) = e^{3x}$
8. Determine if the functions $\{e^{2x}, 5e^{2x}\}$ are linearly independent by using the Wronskian. **Solution:** $W(e^{2x}, 5e^{2x}) = 0$
9. Determine if the functions $\{\cosh x, \sinh x\}$ are linearly independent by using the Wronskian. **Solution:** $W(\cosh, \sinh x) = 1$
10. Find the general solution

$$y'' - 5y' + 6y = 0$$

Solution: $y = c_1e^{2x} + c_2e^{3x}$

11. Find the general solution

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

Solution: Oops

12. Find the general solution

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

Solution: Oops

13. Find the general solution

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

Solution: Oops