

MATH 319 - SEC 003, SPRING 2014. HOMEWORK 7

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Due : Wednesday, March 26.

Please show all your work and/or justify your answers.

Section 3.5 Problems 9-12 In each of the problems 9-12 find the general solution of the given differential equation.

- 9. $u'' + \omega_o^2 u = \cos(\omega t), \omega^2 \neq \omega_o^2$
- 10. $u'' + \omega_o^2 u = \cos(\omega_o t)$
- 11. $y'' + y' + 4y = 2 \sinh t$. *Hint:* $\sinh t = (e^t - e^{-t})/2$.
- 12. $y'' - y' - 2y = \cosh 2t$. *Hint:* $\cosh t = (e^t + e^{-t})/2$

Section 3.5 Problem 18 Find the solution of the given initial value problem

$$y'' + 2y' + 5y = 4e^{-t} \cos(2t), y(0) = 1, y'(0) = 0.$$

Section 3.6 Problems 3 and 4 Use the method of variation of parameters to find a particular solution of the given differential equation. Then check your answer by using the method of undetermined coefficients:

- 3. $y'' + 2y' + y = 3e^{-t}$
- 4. $4y'' - 4y' + y = 16e^{t/2}$

Section 3.6 Problems 7 and 8 Find the general solution of the given differential equation

- 7. $y'' + 4y' + 4y = t^{-2}e^{-2t}, t > 0$
- 8. $y'' + 4y = 3 \csc(2t), 0 < t < \pi/2$

Section 3.6 Problems 14 and 17 Verify that the given functions y_1 and y_2 satisfy the corresponding homogeneous equation; then find a particular solution of the given non homogeneous equation.

- 14. $t^2 y'' - t(t+2)y' + (t+2)y = 2t^3, t > 0; y_1(t) = t, y_2(t) = te^t$
- 17. $x^2 y'' - 3xy' + 4y = x^2 \ln x, x > 0; y_1(x) = x^2, y_2(x) = x^2 \ln x$.