

110-1 ENGINEERING MATHEMATICS HW2

Due Date: 2021/11/03 (2pages)

Part I: Find the general solution of the given differential equation.

1. $y' + 3x^2y = x^2$

Part II: Bernoulli equation

2. $x \frac{dy}{dx} + y = x^2y^2$

Part III: Solve by substitution

3. $(y^2 + yx)dx - x^2dy = 0$

Part IV: Find a member of the family that is a solution of the initial-value problem.(find c_1, c_2)

4. $y = c_1e^x + c_2e^{-x}, (-\infty, \infty); y'' - y = 0,$

$y(0) = 0, y'(0) = 1$

Part V: Reduction of Order(find a second solution y_2)

5. $y'' + 16y = 0, y_1 = \cos 4x$

6. $xy'' + y' = 0, y_1 = \ln x$

Part VI: Homogeneous Linear Equation with Constant

Coefficients(find the general solution, e.g. $y = c_1 e^{?x} + c_2 e^{?x} + \dots$)

7. $y'' - y' - 6y = 0$

8. $y''' + 3y'' + 3y' + y = 0$

Part VII: Undetermined Coefficients

9. $\frac{1}{4}y'' + y' + y = x^2 - 2x$

10. $y'' + 2y' + y = \sin x + 3 \cos 2x$