

Math 217 - October 7, 2010

- Undetermined Coefficients
- Variation of Parameters

1. For each of the equations below, determine the best guess for y_p .

(a) $y'' + y = \sin x$

(b) $y'' + y = \cos x$

(c) $y'' - 3y' + 2y = 3e^x$

(d) $y'' - 3y' + 2y = 3e^{2x}$

(e) $y''' - 3y'' + 2y' = 6x^2$

2. For the equations in the previous problem, find y_p .

Lecture Problems

3. For each of the equations below, find y_c and determine the correct form for y_p .

(a) $y^{(6)} - y^{(5)} = 3x^3 - x$

(b) $y''' - 2y'' + y' = 3x^3$

(c) $y''' - 2y'' + y' = e^x$

(d) $y''' - 2y'' + y' = x^2 e^x$

(e) $y''' - 2y'' + 2y' = -4x^3$

(f) $y''' - 2y'' + 2y' = \sin x$

(g) $y''' - 2y'' + 2y' = x^2 \sin x$

4. For each of the equations below, determine the correct form for y_p .

(a) $(D - 1)(D - 4)^5 y = x^3 + 1$

(b) $(D - 1)(D - 4)^5 y = x^3 + 1 + x^2 e^{4x}$

(c) $(D)(D^2 + 1)^5 y = 4x \sin x$

(d) $y'' - 4y' - 4y = e^{2x} + \pi x \sin x$

(e) $y'' - 2y'' + 7y = e^{2x} \cos x + x^3$

(f) $y'' + 6y' + 12y = \tan x$