MAP2302: Differential Equations.

http://www.imathesis.com/map2302.html

Practice 13.

Topics: 6.2;, 6.3: Homogeneous Linear Equations with constant coefficients. The Annihilator method.

Exercises 6.2 page 332:

Find a general solution for the differential equation with x as the independent variable:

1. $y''' + 2y'' - 8y' = 0$

3. $6z''' + 7z'' - z' - 2z = 0$

5. $y''' + 3y'' + 28y' + 26y = 0$

9. $u''' - 9u'' + 27u' - 27u = 0$

11. $y^{(4)} + 4y''' + 6y'' + 4y' + y = 0$

6.3 page 337. Use the annihilator method to determine the form of a general solution for the given equation[1]:

21. $u'' - 5u' + 6u = \cos 2x + 1$

22. $y'' + 6y' + 8y = e^{3x} - \sin x$ $\qquad y(x) = C_1e^{-4x} + C_2e^{-2x} + C_3e^{3x} + C_4\cos x + C_5\sin x$

23. $y'' - 5y' + 6y = e^{3x} - x^2$

24. $\theta'' - \theta = xe^x$ $\qquad y(x) = C_1e^x + C_2xe^x + C_3x^2e^x + C_4e^{-x}$

25. $y'' - 6y' + 9y = \sin 2x + x$

26. $y'' + 2y' + y = x^2 - x + 1$ $\qquad y(x) = C_1 + C_2x + C_3x^2 + C_4e^{-x} + C_5xe^{-x}$

27. $y'' + 2y' + 2y = e^{-x}\cos x + x^2$

28. $y'' - 6y' + 10y = e^{3x} - x$ $\qquad y(x) = C_1 + C_2x + C_3e^{3x} + e^{3x}(C_4\cos x + C_5\sin x)$

29. $z''' - 2z'' + z' = x - e^x$

30. $y''' + 2y'' - y' - 2y = e^x - 1$ $\qquad y(x) = C_1 + C_2e^x + C_3xe^x + C_4e^{-x} + C_5e^{-2x}$

[1]Note: The actual question on the book reads *determine the form of a particular solution*; we are finding the general solution instead.