

To do List

1. Watch the lectures from section 3.5 and make detailed notes
2. Do the following problems before starting the lecture on Friday.
3. **NOTE:** I will not collect the worksheet problems. These problems are meant to check your understanding and generate questions to ask me during office hours when you get stuck.

Objectives

By the end of this lecture you should be able to

1. Solve non-homogeneous problems with exponential, polynomial and trigonometric right hand sides.
2. Write detailed solutions to the problems below in your notebook.

Find the general solution

1. $y'' - 2y' - 3y = 3e^{2t}$

Notes:

The right hand side is exponential so choose $y_p(t) = Ae^{2t}$. Your solution should be

$$y(t) = c_1e^{3t} + c_2e^{-t} - e^{2t}$$

2. $y'' - y' - 2y = -2t - 4t^2$

Notes:

The right hand side is a quadratic function so choose $y_p(t) = At^2 + Bt + C$. Your general solution should be

$$y(t) = c_1e^{-t} + c_2e^{2t} + (2t^2 - t + \frac{5}{2})$$

3. $y'' - 3y' - 4y = 2\sin(t)$

Notes: The right hand side is trigonometric so choose $y_p(t) = A\sin(t) + B\cos(t)$. Your general solution should be

$$y(t) = c_1e^{-t} + c_2e^{4t} + \left(-\frac{5}{17}\sin(t) + \frac{3}{17}\cos(t)\right)$$

Additional Reading/ Examples

Section 3.5 pages 133 –136 (up to Example 2)