

To do List

1. Check solutions to worksheet (03/18)
2. Watch Examples 4 and 5 and make detailed notes
3. Do the following problems before starting the lecture on Monday
4. **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 if you get stuck.

Objectives

By the end of this lecture you should be able to

1. Solve non-homogeneous problems with various combinations of exponential, polynomial and trigonometric right hand sides.
 2. Write detailed solutions to the problems below in your notebook.
1. Find the general solution to $y'' + 4y = 5t^2e^t$

Notes:

(a) First solve the homogeneous problem to find $y_c(t)$.

(b) The right hand side is a product of a quadratic and exponential function so choose

$$y_p(t) = (At^2 + Bt + C)e^t$$

(c)

$$y(t) = c_1 \cos(2t) + c_2 \sin(2t) + \left(t^2 - \frac{4}{5}t - \frac{2}{25}\right)e^t$$

2. Given that $y_1(t) = \cos(t)$ is a solution to

$$y'' - y' + y = \sin(t)$$

and $y_2(t) = \frac{1}{3}e^{2t}$ is a solution to

$$y'' - y' + y = e^{2t}$$

find solutions to

(a) $y'' - y' + y = \sin(t) + e^{2t}$

(b) $y'' - y' + y = 5 \sin(t)$

(c) $y'' - y' + y = 4 \sin(t) - 18e^{2t}$

Notes:

(a) Note: If you find yourself doing a lot of calculations, STOP. Think carefully about how you can use the solutions $y_1(t)$ and $y_2(t)$ above to write solutions to the new ODES. Look at what we did in Example 5 in the lecture videos.

Additional Reading/ Examples

Section 3.5 pages 136 –137

Have a good weekend!