

HOMEWORK #13 (Chapter 5 Series solutions of Linear Equations)

In problem 1, find the solution by using the Taylor series method and the recurrence relations method.

1. $y'' + e^x y' - y = 0$ (Exercises 5.1 Problem 30)

In problems 2~3, $x = 0$ is a regular singular point of the given differential equation. Use the method of Frobenius to obtain at least one series solution about $x = 0$. Use

$$y_2(x) = y_1(x) \int \frac{e^{-\int p(x)dx}}{y_1^2(x)} dx$$
 where necessary and a CAS, if instructed, to find a second

solution. From the general solution on $(0, \infty)$.

2. $xy'' - xy' + y = 0$ (Exercises 5.2 Problem 27)

3. $xy'' + (1-x)y' - y = 0$ (Exercises 5.2 Problem 29)