

## XM531 Problem Set 3

## Problem 1

Use the method of variation of parameters to determine the general solution of the differential equation

$$y''' + y' = \sec t, \frac{-\pi}{2} < t < \frac{\pi}{2}.$$

[illegible]

Use the method of undetermined coefficients to determine the general solution of the differential equation

$$y^{(4)} + y'' + y = \sin t.$$

## Problem 2

### Problem 3

Determine the radius of convergence of the power series

$$\sum_{n=1}^{\infty} \frac{n!x^n}{n^n}.$$

## Problem 4

Consider the initial value problem

$$y'' + xy' + 2y = 0; \quad y(0) = 4, \quad y'(0) = -1.$$

- Find the first five nonzero terms in the solution of the given initial value problem.
- Plot the four-term and five-term approximations to the solution on the same axes.
- From the plot in part (b) estimate the interval in which the four-term approximation is reasonably accurate.

[illegible]

