MATH 411 - Summer 1998
Homework 6 - Due 07/10, Friday

1- Consider the initial value problem

$$Y' = \mathbf{A}(t)Y, \quad Y(0) = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

where

$$\mathbf{A}(t) = \begin{pmatrix} 0 & 1 \\ -1 & -t^2 \end{pmatrix}.$$

Find the first three terms of the series expansion for the solution $Y(t)$.

2- Find the series expansion about $\tau = 0$ for the solution of

$$\begin{gathered} y'' + 3\sin(t)y' - \frac{2t}{1-t}y = 0, \\ Y(0) = c_0, \quad Y'(0) = c_1. \end{gathered}$$

What's the region of validity for such expansion?

3- Page 155, problem 21 of the book.