

SMA209-Mathematics 2 MATLAB assignment

Total marks: 30

Submission deadline: 30/05/2021, 23.59 pm

Question 1 (Fourier series)

Calculate a_0 , a_n , b_n and the sum of first six partial sums, and show their corresponding plots using MATLAB.

$$f(x) = \begin{cases} 1+x, & \text{for } -1 \leq x \leq 0, \\ 1, & \text{for } 0 < x \leq 1, \end{cases} \quad \text{on } [-1, 1]$$

[Marks 10]

Question 2 (Ordinary Differential equation)

Solve the following initial value problem using MATLAB

$$y' + y \tan x = \sin 2x, \quad y(0) = 1$$

[Marks 5]

Question 3 (Laplace transformation)

Find a general solution using MATLAB and Laplace Transform for the following differential equation:

$$5y' + 2y = \sin t$$

[Marks 15]

Note: You must attach the file for the MATLAB script (.m file) and a word document which provides an organised compilation of the MATLAB results and screen shots.

Helpful link for Fourier series and Laplace Transform using MATLAB:

<https://au.mathworks.com/help/curvefit/fourier.html>

https://au.mathworks.com/help/symbolic/sym.laplace.html?searchHighlight=laplace%20transform&s_tid=srchtitle

https://au.mathworks.com/help/symbolic/referencelist.html?type=function&s_tid=CRUX_topnav