MATH5004 TUTORIAL 2
Finite Difference Method

Exercise 1. Consider a Two-point BVP:

$$u_{xx} = f(x), \qquad x \in (0,1)$$

$$u(0) = 1, \qquad u(1) = -1,$$

where $f(x) = -\pi^2 \cos(\pi x)$.

Exercise 2. Solve

$$\frac{\partial u}{\partial t} = \frac{1}{10} \frac{\partial^2 u}{\partial x^2}, \quad (x,t) \in (0,1) \times (0,\tau)$$

$$u(x,0) = 1,$$

$$u(0,t) = 0, \qquad \frac{\partial u}{\partial t}(1,t) = 0.$$

Assignment I

Question 1. (TUT-WK2)
Derive Finite Difference Scheme to solve the following steady state heat conduction problem

$$k(x) \frac{\partial^2 u}{\partial x^2} = f(x), \ \ 0 < x < 1$$

$$u(0) = 1, \qquad \frac{\partial}{\partial x} u(1) = 0,$$

where $f(x) = -\cos(\pi x), \ k = \pi x^2$.

Note: Assignments I & II (50%): Assignment Questions will be given weekly.

In this week, Questions 1 (TUT-WK2) is a part of Assignment I, please submit a document file with MATLAB code via Blackboard by the due date of Assignment I on Friday 11 September 2020

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