MTH 430: Numerical Analysis & Scientific Computing II
Department of Mathematics and Statistics
Indian Institute of Technology - Kanpur March 17, 2025

LAB 6

Solve the following two-point boundary value problems using the second order finite difference scheme:

1.

$$\begin{aligned} u'' + u &= f, \quad -1 < t < 1, \\ u(-1) &= u(1) = 0, \end{aligned}$$

with $f \in C([-1, 1])$. Check your code on at least three problems with different choices of f (for which you know how to obtain the exact solution).

2.

$$\begin{aligned} u'' + u &= \frac{2(u')^2}{u}, \quad -1 < t < 1, \\ u(-1) &= u(1) = (e + e^{-1})^{-1}. \end{aligned}$$