Homework 3: Report

Dante Buhl

May 15, 2024

Question 1: BVP for 2D Poisson's Equation

a) Write Code

b) Plot Numerical Solution for (N,M) = (81, 51)

c) plot the solution at y = 0.2, and y = 0.5 as a function of x (put both in the same figure)

Question 2: IBVP for 1D Heat Equation

a) Determine the analytical solution

b) Plot the analytical solution as a surface plot over [x, t]

c) Write code and integrate using secodn-order finite differences and CN

d) Wrote code and integrate using Gauss-Chebyshev-Lobatto coallocation method

e) plot maximum pointwise error on a log scale plot between analytical and numerical solutions

Question 3: Extra Credit

a) Write code to compute the nuemrical solution using secondorder finite diff, and AB2.

b) plot the numerical solution as a surface plot

c) plot the numerical sollution at t = 62 as a function of x.