

PHYS 103 – Spring 2019

Homework 7

Due on Monday 06/03 by 6 PM in box outside Daly 312

1. Problem 7.5. Instructions: Apply the von Neumann stability analysis to this scheme and find the stability criterion on τ . Provide plots showing the initial and final shapes of the wave pulse for three values of τ : 0.025, 0.02, and 0.015 ($N=50$ in all cases). In each case use the number of time steps necessary to complete a single cycle.
2. Perform von Neumann stability analysis for the DuFort-Frankel scheme applied to the diffusion equation in problem 6.9
3. Problem 9.2.
4. Problem 8.8.

Instructions:

- You can define a matrix of size $N \times N$ that will represent the cage potential superimposed on the calculated potential in every iteration. This matrix should contain ones everywhere except at the Faraday cage points where it should be zero.
- Your program can then have a menu with four options: the three cages, and no cage at all.
- For each cage geometry provide contour and mesh plots of the potential