

# Homework 4 Report

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## Question 1

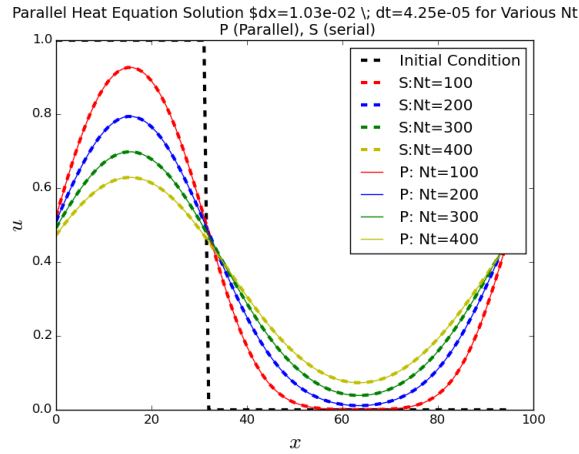


Figure 1: Parallel Heat equation solved for initial conditions in serial and parallel and serial for various Nt (Number of time steps). Stable  $\Delta t$

## Question 2

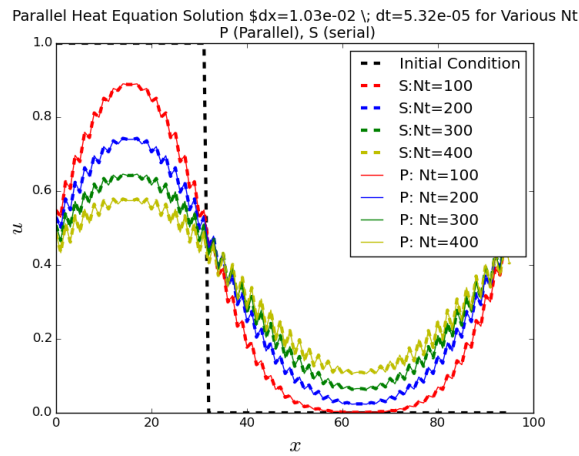


Figure 2: Parallel Heat equation solved for initial conditions in serial and parallel and serial for various Nt (Number of time steps). Unstable  $\Delta t$ .

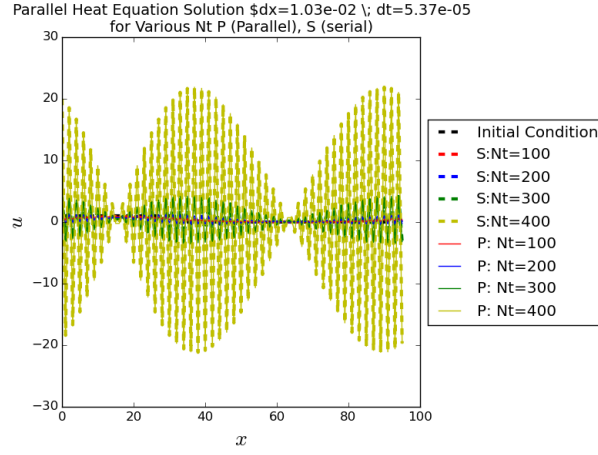


Figure 3: Parallel Heat equation solved for initial conditions in serial and parallel and serial for various Nt (Number of time steps). Another Unstable dt.

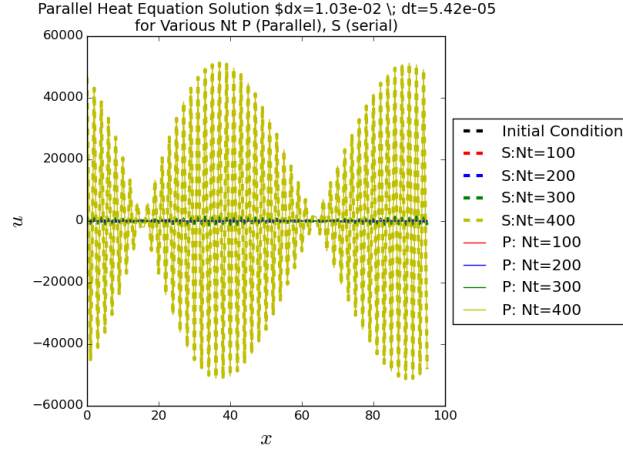


Figure 4: Parallel Heat equation solved for initial conditions in serial and parallel and serial for various Nt (Number of time steps). Another Unstable dt.

### Question 3

I plan to implement the Open MP skills I have learn in a project studying the stability of stationary solutions to the Sine Gordon Equation, I am currently doing. Currently I have Mathematica code that numerically computes the Stability spectrum using the Floquet-Fourier-Hill Method (FFHM). To produce well resolved spectra and investigate the Sine Gordon parameter space requires the code to be highly efficient. I realised that the FFHM is an embarrassingly parallisable method, so I should be able to get more higher performing code using C and Open MP!