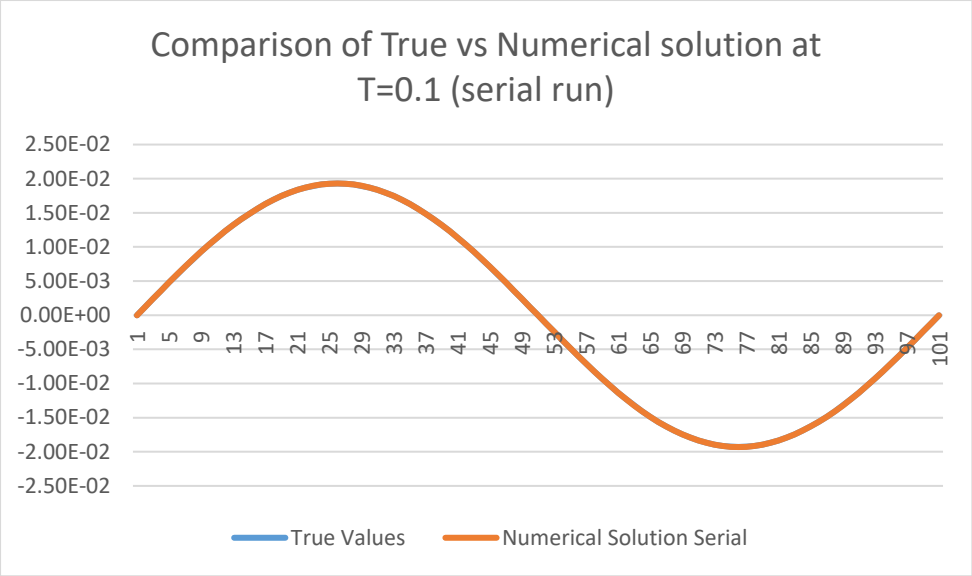
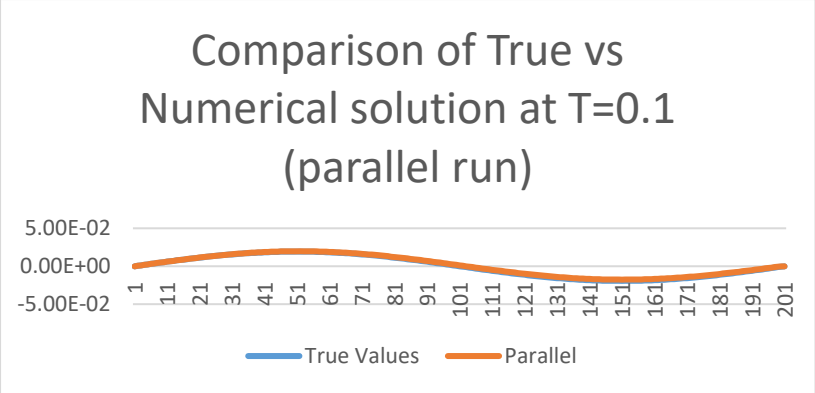
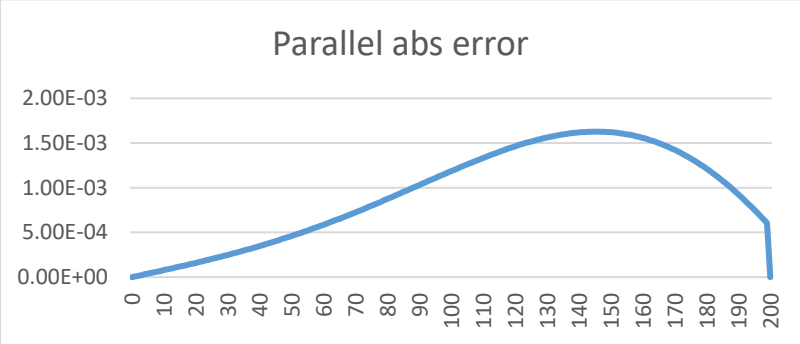
We are solving 1-d heat equations with initial conditions as specified in the question.
We are interested in solution at T=0.1. For the serial run we use M=100 space meshsize and N=10000 time meshsize. This gives dx=1/M=0.01 and dt=0.1/N=0.000001 so that dt/dx^2=0.01<0.5 so the Euler method is numerically stable.



We then parallelise the code using 2, 4 , 6 processes using MPI and halo-swapping and set space meshsize to satisfy M=#processes*(K-2)+2 where K is the number of grid points including overlaps given to each process:





So this case is not interesting, parallelisation increases runtime and lowers the accuracy. Perhaps we could get more interesting results by considering different timeframes and meshsizes but it involves varying dt/dx^2 ratio to be numerically stable so there are few moving parts that we are trying to control.