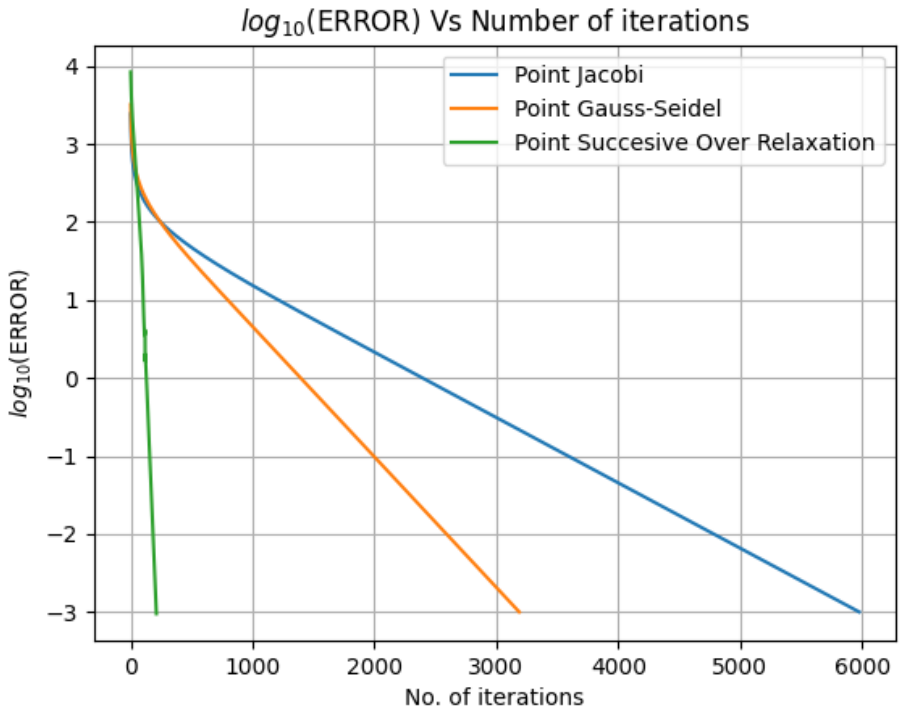
AE 706

Assignment 2

Report By – Meet

Roll No. - 210010041

Convergence History Plot



Number of iterations:

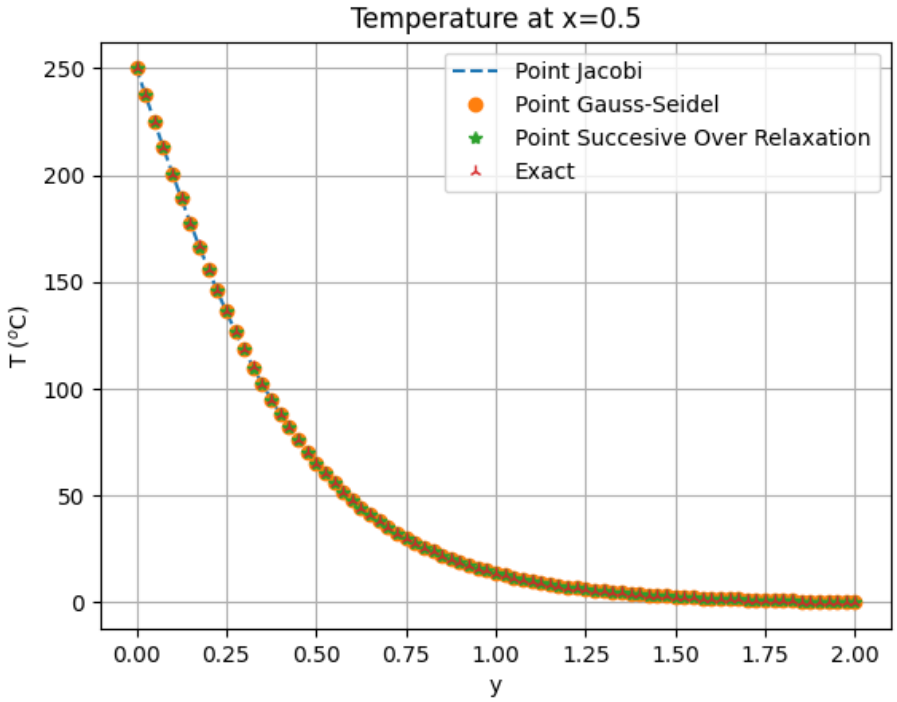
Point Jacobi = 5977

Point Gauss-Seidel = 3189

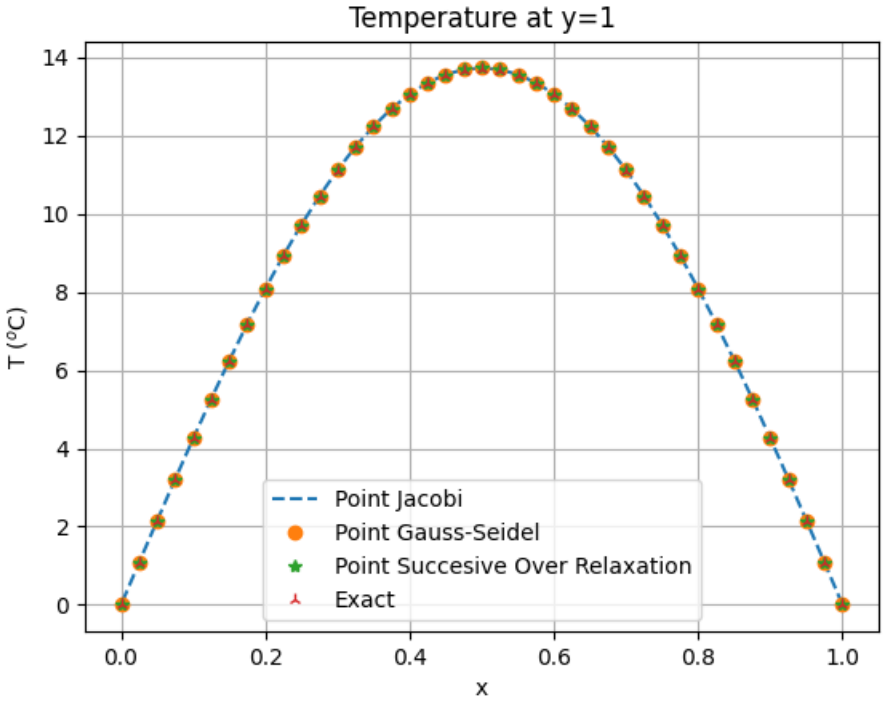
Point Successive Over Relaxation = 212

Midline temperature variation

Along x=0.5

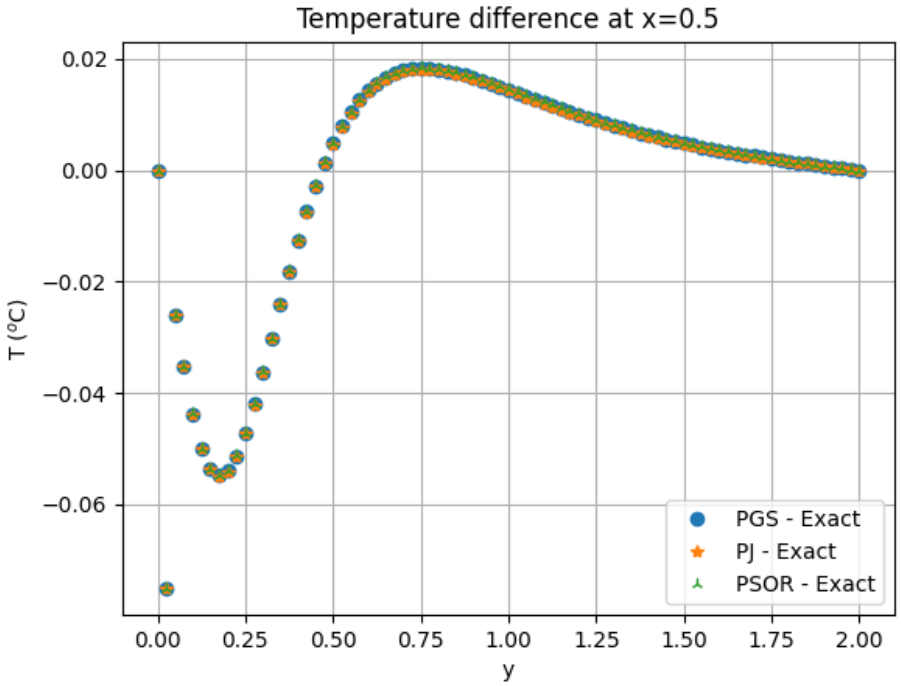


Along y=1

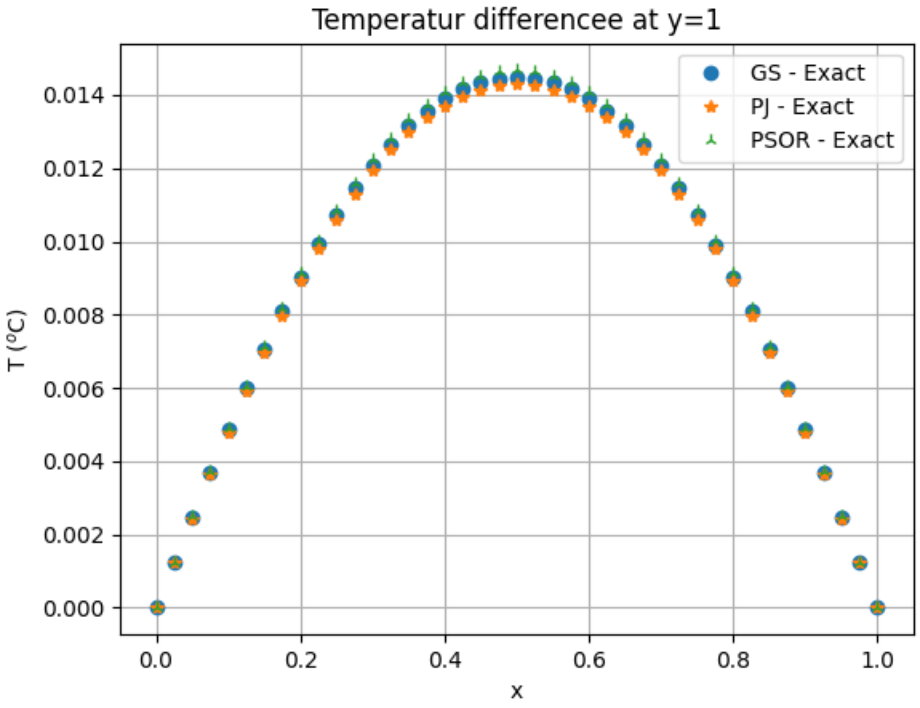


Comparision with exact results

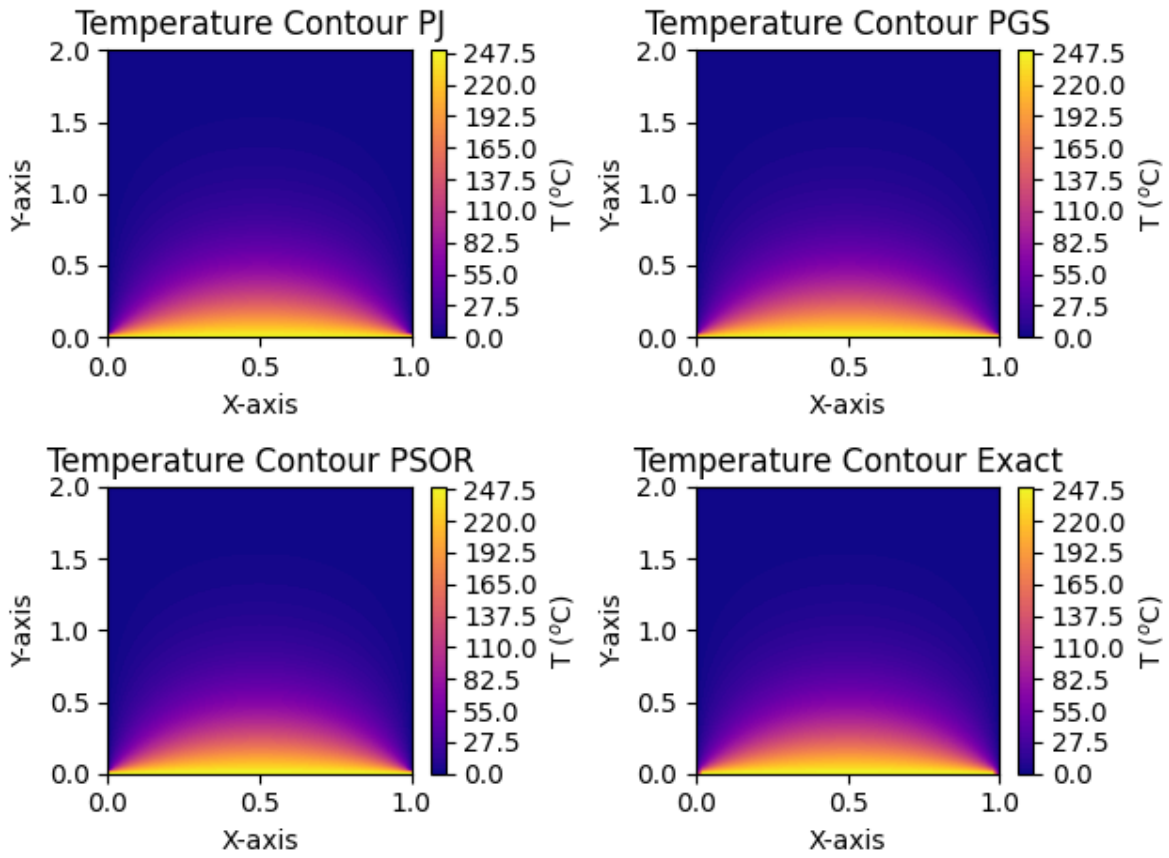
Along x=0.5



Along y=1



Contour Plots



Conclusions:

- PSOR outperforms PJ and PGS with significantly fewer iterations for convergence.
- Initially, the error is highest in PSOR and lowest in PJ. This shows that PSOR moves much faster to the solution i.e. it causes higher changes in the grid point values in a single iteration, thus requiring fewer iterations to converge to the solution.
- The temperature along x=0.5 decreases from 250 ^{o}C to 0 ^{o}C , and along y=1 follow a symmetric variation as expected from intuition from the problem geometry.
- In the error plot, all the three schemes coincide with each other, all producing similar error which is negligible. The three schemes converge to the same solution although taking different time to do so.
- Contour plots for exact, PJ, PGS and PSOR look similar, again showing that all the schemes converge to the same solution with required precision.