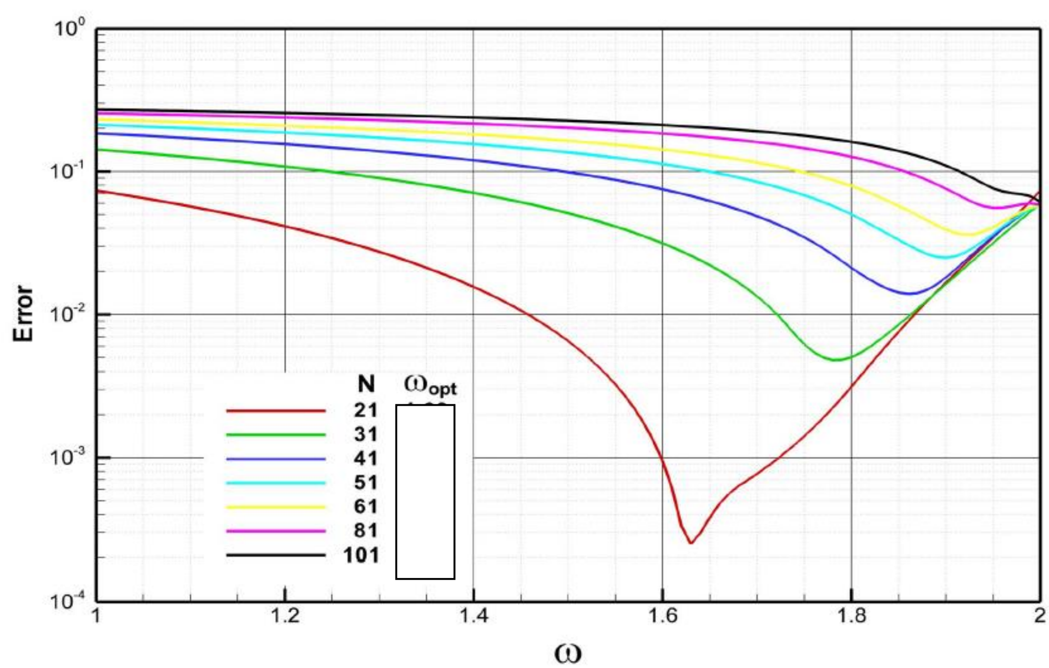
Dear CE 580 Students,

My comments on HW6 and your questions are as follows:

1. As we discussed in the lectures, numerical solution of Poisson equation is independent of the source term. In other words, solution accuracy, convergence rate, are not affected by the source term. Thus, Poisson or Laplace eqns. can be solved by the same numerical techniques. Please verify that in our example the source term is zero.
2. In your code you must define two 2D arrays U and S
3. Input N and initialize the arrays. U=0. , S=0.
4. You are given an analytical function ($U=x^2-y^2$) that satisfies the Laplace equation. This is our analytical solution from which value of the dependent variable 'U' can be computed anywhere in the solution domain including the boundary conditions.
5. The symbol S used in the homework paper is not the source, it is the numerical solution you should obtain that corresponds to the analytical solution 'U'.
6. The boundary conditions (all four sides of the square domain) must be set from the analytical solution and unchanged throughout this homework.
7. Apply the solution technique PSOR from the lecture notes.
8. In part A, first fix ω value ($1\leq\omega\geq2$) Then apply the solution for all internal nodes: $2\leq i\geq N-1$ and $2\leq j\geq N-1$. This is one PSOR iteration. Repeat 20 iterations, calculate the error and printout ω and the error. Then change value of ω and initialize the solution array and repeat the above procedure.
9. Repeat the above work for the recommended values of N
10. Prepare the following plot



11. Now, you can complete part B as described in the homework page