TFY4235/FY8904: Computational Physics, Spring 2013

Problem set 3

Problem 1.

Assume 1000 resistors with conductances distributed randomly between zero and one, are coupled in series. A potential drop of one is set up between the ends of this chain. Write routines based on (1) the Jacobi, (2) Gauss-Seidel and (3) SOR algorithms to determine the potential between each resistor. Compare the convergence rates of the three algorithms.

You will need to assign to each resistor a number gotten from a random number generator.

For the industrious: Increase the number of resistors beyond 1000. What happens to the number of iterations?