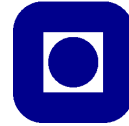


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Problemset 3 Spring 2015

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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 (i) the Jacobi, (ii) Gauss-Seidel and (iii) SOR algorithms to determine the potential between each resistor. Compare the convergence rates (or spectral radius) of the three algorithms.

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

For the industrious:

- Increase the number of resistors beyond 1000. What happens to the number of iterations?
- Evaluate some preconditioners in order to see if it may improve the rate of convergence.