

CS2262 Spring 2007

Assignment 12: Iterative Solvers

1. Explain the difference between direct methods for solving linear systems and iterative methods. Name one example for solving a linear system with each method, and describe the method.
2. For the following system:

$$\begin{aligned}2x_1 + x_2 - x_3 &= 6 \\4x_1 - x_3 &= 6 \\-8x_1 + 2x_2 + 2x_3 &= -8\end{aligned}$$

Repeat the logic in A&H 6.6 to provide the iteration sequence for both the Jacobi and Gauss-Seidel methods. Also work through the method in 6.6.2 to derive the form of the matrices N and P for this example. Calculate the value of the norm of $N^{-1}P$ to determine whether or not the Jacobi method will converge.

3. Give two reasons why iterative methods are preferred over direct methods for large systems of equations.
4. A&H 6.6: page 314, #2.

Due May 3rd 2007

Email completed assignments to cs2262_assignments@cct.lsu.edu