

Engineering Analysis ENG 3420 Fall 2009

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Lecture 19

- Last time:
 - Midterm: solutions and discussions Today:
- Today
 - The inverse of a matrix
 - Iterative methods for solving systems of linear equations
 - Gauss-Siedel
 - Jacobi
- Next Time
 - Relaxation
 - Non-linear systems

The inverse of a square

- If $[A]$ is a square matrix, there is another matrix $[A]^{-1}$, called the inverse of $[A]$, for which $[A][A]^{-1}=[A]^{-1}[A]=[I]$
- The inverse can be computed in a column by column fashion by generating solutions with unit vectors as the right-hand-side constants:

$$[A]\{x_1\} = \begin{Bmatrix} 1 \\ 0 \\ 0 \end{Bmatrix} \quad [A]\{x_2\} = \begin{Bmatrix} 0 \\ 1 \\ 0 \end{Bmatrix} \quad [A]\{x_3\} = \begin{Bmatrix} 0 \\ 0 \\ 1 \end{Bmatrix}$$

$$[A]^{-1} = [x_1 \quad x_2 \quad x_3]$$