

Quiz 06

Jan 05, 2010.

1. Let A, B be two real $n \times n$ matrices. Show that $\|AB\| \leq \|A\|\|B\|$. Here the matrix norm is not specified (it could be generated from L^2 , L^∞ or other norms in $\mathbb{R}^n$). You can prove it for one particular norm, or give a proof that works for any norm.
2. Show that $\text{cond}(A) \geq 1$ for any A .
3. Describe Jacobi iteration and Gauss-Siedel iteration.
4. Let $A = \begin{pmatrix} 3 & 1 & 0 \\ 1 & 3 & 0 \\ -1 & 1 & 3 \end{pmatrix}$. Give a convergent iteration method for solving $Ax = b$.
Explain why it converges.
5. Let $B = \begin{pmatrix} 0.5 & 1 & 0 \\ 1 & 0.5 & 0 \\ -1 & 1 & 0.5 \end{pmatrix}$. Give a convergent iteration method for solving $Bx = b$.
Explain why it converges.

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