

Numerical Analysis I

Homework 4

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1. Prove these facts, needed in the proof Cholesky Theorem on LL^T decomposition.
 - (a) If U is upper triangular and invertible, then U^{-1} is upper triangular.
 - (b) The inverse of unit lower triangular matrix is unit lower triangular.
 - (c) The product of two upper (lower) triangular matrices is upper (lower) triangular.
 2. Prove that A is positive definite and B is nonsingular if and only if BAB^T is positive definite.
 3. Find the LU -decomposition and LL^T -decomposition of the matrix

$$A = \begin{bmatrix} 2 & 6 & -4 \\ 6 & 17 & -17 \\ -4 & -17 & -20 \end{bmatrix},$$

in which L is lower triangular and U is unit upper triangular.
