Exercises, week 7

1. Show that no LU factorization is possible for $A = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$.

2. Use the definition to check whether $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ is positive semidefinite.

3. Find the Cholesky decomposition of $A = \begin{pmatrix} 1 & 1 \\ 1 & 4 \end{pmatrix}$.

4. Find the operator norm of $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$.

5. Find the condition number of $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$.

Homework 6, due March 3.

Find the Cholesky decomposition for $A = \begin{pmatrix} 4 & 1 & 0 \\ 1 & 4 & 1 \\ 0 & 1 & 4 \end{pmatrix}$, i.e., find the lower triangular matrix $L$ with positive diagonal entries such that $A = LL^T$. How would you use the Cholesky decomposition to solve $Ax = b$?