

**Ma 405: Introduction to Computational Mathematics**  
**Reading and Homework Assignment 8**

PROF. WICKERHAUSER

You are allowed to collaborate with one other person on homework, but then you must indicate both contributor's names on your solution sheet.

You are also encouraged to work additional exercises from the indicated sections, although the homework grade will be based only on the exercises listed below.

Please return your solutions to me by the end of class on the due date. **Late homework will not be accepted.**

Read Chapter 4, sections 4.4 and 4.5

**P.132 Exercises 4.4.**

4.4.3, 4.4.8

**Pp.141–143 Exercises 4.5.**

4.5.6, 4.5.10

**Extra problem 1.** Find the Cholesky decomposition of the the  $4 \times 4$  discrete Laplacian. Try to find a general formula for the Cholesky decomposition of the  $n \times n$  discrete Laplacian.

**Extra problem 2.** Find the QR factorization of

$$A = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 \\ 1 & -1 & -1 & 1 \\ 1 & -1 & 1 & -1 \end{pmatrix}$$

(Hint: observe that  $A$  is a scalar multiple of an orthogonal matrix.)