

STAT 607–Winter2017: Numerical Methods in Statistics Part II.

- **Web site:** ctools.umich.edu (canvas).
- **Instructor:** Yves Atchadé (yvesa@umich.edu); Office: 272 WH. Phone: 734-763-5238.
- **Office Hours:** Tues. 3:00-4:00pm.
- **Lectures:** Mo-We. 4-5:30pm, 1068 East Hall.
- **GSI:** Anwesha Bhattacharyya, anwebha@umich.edu. Office Hours: Tues 4-5pm, and Th. 4-5pm in SLC (Chemistry building).
- **Prerequisites:** Regression methods; probability and statistical theory at the level of Stat 425/426, Biostat 601/602. Exposure to computer programming strongly recommended.
- **Objectives:** This course is an introduction to matrix computations, as used in statistics. The emphasis is on both the theory and as well as the implementation of the algorithms. The class will be taught using programs written in **Matlab**, R or C. Students may write their homework solutions using any of these languages.
- **Outline:**
 - Chapter 1** Linear systems: the LU and Cholesky decompositions.
 - Chapter 2** Orthogonalization.
 - Chapter 3** Algorithms for eigenvalue computation.
 - Chapter 4** Some stochastic methods in numerical linear algebra.
- **Suggested textbooks:**
 1. Numerical Linear Algebra, L. N. Trefethen and D. Bau III, SIAM, 1997.
 2. Matrix Computations, G. H. Golub, C. F. Van loan, John Hopkins Univ. Press, 2013.
- **Grading:** Homework (50%), final exam: (50%).
 1. The homeworks will be a mix of theoretical questions and coding. Groups of two students are allowed.
 2. The final exam is a closed book exam to evaluate the understanding of the algorithms studied in the course. The emphasis will be on the theory.