

Homework 1 - Due Fri. Sep. 15th

AS.110.675, EN.553.738

Dr. Mauro Maggioni
Web page: www.math.jhu.edu/~mauro

Office: 405 Krieger Hall
E-mail: myfirstname.maggioni@jhu.edu

Homework Policies

Homework is due by 4pm on the day indicated, in my mailbox in Krieger, 4th floor, room 409. The room closes around 4pm.

No late homework will be accepted without permission obtained in advance. Johns Hopkins' policies apply with no exceptions to cases of incapacitating short-term illness, or for officially recognized religious holiday. You may, and are encouraged to, discuss issues raised by the class or the homework problems with your fellow students and both offer and receive advice. However all submitted homework must be written up individually without consulting anyone else's written solution.

The submission of homework that require numerical work on a computer should include the following: printout of the code used to solve the problems, of its inputs and of its outputs. The code should be written clearly, copiously commented, and input/outputs of the code clearly documented in format and content. The specific outputs requested by the exercise should be discussed in your writeup as needed in order to answer the questions in the problems. For example if the problem asks you to compare the results of two algorithms for solving a given linear system, you should exhibit the the code for the two algorithms, commented, the input to the algorithms and the two outputs, and comment on whether the results are the same or not, why, etc...

Assignment

Review your linear algebra and basic probability. For linear algebra, we will soon be using (abstract) vectors spaces, norms, inner products, linear operators, bases. For probability, random variables, their distributions, limit theorems. See chapter 1 in R. Vershynin's lecture notes for things to review, as well as the Appendix 12.4 in R. Kannan et. al.'s lectures notes. Both of these references are listed on my webpage in the list of references for this course.

Study R. Vershynin's Lectures notes up to section 2.4. We covered the main parts in class, but skipped a few things: read those as well.

Exercises

Exercise 1 (25pts). Exercise 1.2.3 in R. Vershynin's textbook, p -moments via tails.

Exercise 2 (25pts). Exercise 1.2.6 in R. Vershynin's textbook, Chebyshev's inequality.

Exercise 3 (50pts). Exercise 2.2.10 in R. Vershynin's textbook, on small ball probabilities.