

Homework 1 - Due Wed. Sep 12th

High-Dimensional Approximation, Probability, and Statistical Learning

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Homework Policies

Homework is due to the TA on the due date before the beginning of class.

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. We will soon be using (abstract) vectors spaces, linear operators, norms, inner products, bases, projections, etc...

Exercises: from Blum, Hopcroft, Kannan *Foundations of Data Science*: Comment and discuss your results from numerical simulations, explaining how they match the results in Lecture 2 in the lecture notes/class.

Exercise 1 (20pts). Exercise 2.2 from the lecture notes indicated above.

Exercise 2 (20pts). Exercise 2.17 from the lecture notes indicated above.

Exercise 3 (20pts). Exercise 2.22 from the lecture notes indicated above.

Exercise 4 (20pts). Exercise 2.26 from the lecture notes indicated above.

Exercise 5 (20pts). Exercise 2.28 from the lecture notes indicated above.