GMDL, HW #1

Oren Freifeld and Ron Shapira Weber
The Department of Computer Science, Ben-Gurion University

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Abstract

Please read the general HW instructions in the course website. The purpose of this assignment is to build some of the mathematical background that we will need throughout the semester. The coding part in this assignment is very small (and does not represent other assignments in this class). If you have no experience with Python/Numpy you may want to check the pointers in the course website under "Python/Numpy". All the notes mentioned below are available at the course website.

Version Log

- 1.00, 26/3 . Initial release

Problem 1 *According to the general HW instructions in the course website:*

(a) What will be your grade if you submit your HW after the deadline?

(b) Will handwritten reports be accepted?

(c) Suppose you choose, for reasons we cannot understand, to prepare the HW report using Microsoft Word (instead of, e.g.*, using LaTeX like a civilized person would do). What will be your grade if you submit your report in a .DOC/.DOCX format (instead of converting it to PDF)?* ♢

- Read the **"Notes on SPD Matrices, Inner Products, Norms, and Metrics"** and solve all the problems therein. Additionally, do Computer Exercise 1 from those notes. In that Computer Exercise, feel free to get "inspired" by the examples in the Notebook (see the class website) on norms induces by SPD matrices (especially if you are unfamiliar with `mgrid` (the latter is a NumPy command).
- Read the **"Notes on Convexity"** and solve all the problems therein.
- Read the **"Notes on Argmin and Argmax"** and solve all the problems therein.
- Read the **"Notes on Linear Least Squares"** and solve all the problems therein.
- Read **Sections 1 and 2** in the **"Notes on Random Vectors"** and solve all the problems therein. Remark: Section 3 is optional.