MATH 612: CM4ES&FM

Instructions

- The Assignment 2 and 3 problems make reference to problems at the end of the classnotes we have been using for the optimization part.

- One problem per page. (You can have two problems in different sides of the same page.)

- The fourth requires some coding. This problem has to be solved individually.

1. Show that if $f_1, \ldots, f_k$ is convex and $\lambda_1, \ldots, \lambda_k \geq 0$, then $g = \lambda_1 f_1 + \ldots + \lambda_k f_k$ is convex. Show that if in addition f_1 is strictly convex and $\lambda_1 > 0$, then g is strictly convex.

2. Show that if $f_1, \ldots, f_k$ are convex, then $g(x) = \max\{f_1(x), \ldots, f_k(x)\}$ is convex. Show that if all $f_1, \ldots, f_k$ are convex, then g is strictly convex.

3. Assignment 2. Problem 1(a), (c), and (d)

4. Assignment 2. Problem 2. (For this one, figure out how to use Matlab to solve quadratic programming problems, i.e., problems of minimization of quadratic functionals subject to linear restrictions.)

5. Assignment 3. Problem 2(a) and (b)

6. Assignment 3, Problem 3.