Weekly Homework 3

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Constrained Optimizations & Unconstrained Optimizations
Due December 13, 2012

Exercise 1. (18 points) Find the maxima and minima of the following functions, subject to the corresponding constraints:

$$a) \quad f(x_1, x_2) = x_1 + 2x_2 \qquad\qquad subject\ to \quad x_1^2 + 2x_2^2 = 1$$

$$b) \quad f(x_1, x_2) = log(1 + x_1^2) - 2x_2 \qquad subject\ to \quad (1 + x_1^2)^2 + x_2^2 = 2$$

Exercise 2. (12 points) Find the maxima and minima of the following function:

$$1) \quad f(x_1, x_2, x_3) = x_1^2 - 4x_1x_2 + 4x_2^2 + 3x_3^2$$

Exercise 3. (3 points) Clearly state the interpretation of Lagrange multipliers.