Homework CAO – Series A, September, 2010

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Due: Turn in your solutions by October 18, 10:15 a.m. Make precisely three out of the five problems (you may choose them yourself).

Problem 1. Let $a \in \mathbb{R}^n$, $a \neq 0$. Use the "small" KKT Theorem 2.10 to determine the optimal solution of the following problem: minimize the norm $\|x\|$ over $S := \{x \in \mathbb{R}^n : a^t x = 1\}$. Next, derive the same optimal solution in another way, namely by appication of the "big" KKT theorem as stated in Corollary 3.5 but now by using the affine hyperplane $L := \{x \in \mathbb{R}^n : a^t x = 1\}$.

Problem 2. On p. 12 of the syllabus "On Subdifferential Calculus" the remainder of the proof of Proposition 2.6 is left to the reader as an exercise. Make this exercise.

Problem 3. Make Exercise 2.11 of "On Subdifferential Calculus".

Problem 4. Make Exercise 2.14 of "On subdifferential calculus".

Problem 5. Make Exercise 3.5 of "On subdifferential calculus".