

Homework 7

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1. 用乘子法求解下列问题:

(1) $\min x_1^2 + x_2^2, \quad \text{s.t. } x_1 \geq 1.$

(2) $\min x_1 + \frac{1}{3}(x_2 + 1)^2, \quad \text{s.t. } x_1 \geq 0, x_2 \geq 1.$

2. 对于下列每种情形, 写出在点 $x \in S$ 处的可行方向集:

(1) $S = \{x \mid Ax = b, x \geq 0\};$

(2) $S = \{x \mid Ax \leq b, Ex = e, x \geq 0\};$

(3) $S = \{x \mid Ax \geq b, x \geq 0\}.$

3. 用 Zoutendijk 方法求解下列问题:

$$\min x_1^2 + 4x_2^2 - 34x_1 - 32x_2,$$

$$\text{s.t. } 2x_1 + x_2 \leq 6,$$

$$x_2 \leq 2,$$

$$x_1, x_2 \geq 0.$$

4. 考虑线性规划问题

$$\min_{x \in \mathbb{R}^n} c^T x, \quad \text{s.t. } Ax = b, x \geq 0.$$

写出该问题的增广拉格朗日函数法.