



# Homework for Chapter 6

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1. Solve the optimization problem with equality constraints: **(10 pts)**

$$\min f(\mathbf{X}) = x_1^2 + 4x_2^2 - 2x_1$$

$$\text{s. t. } x_1^2 + x_2^2 - 1 = 0$$

$$x_1^2 + x_2^2 - 4x_1 + 3 = 0$$



## Homework for Chapter 6 (Cont'd)

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**2. Using the K-T condition, identify whether  $X = [1, 1, 1]^T$  is the minimum point of the optimization problem or not: (10 pts)**

$$\min f(X) = -3x_1^2 + x_2^2 + 2x_3^2$$

$$\text{s. t. } x_1 - x_2 \leq 0$$

$$x_1^2 - x_3^2 \leq 0$$

$$x_1, x_2, x_3 \geq 0$$



## Due in Final Exam (2023/11/14)

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**3. Solve the following constrained problem using the Feasible Direction Method: (20 pts)**

$$\min f(X) = x_1^2 + x_2^2 - 2x_1 - 4x_2 + 6$$

$$\text{s.t.} \quad -2x_1 + x_2 + 1 \geq 0$$

$$-x_1 - x_2 + 2 \geq 0$$

$$x_1, x_2 \geq 0$$