# Lab Assignment 8

October 20, 2022

**Q1.** Solve the following problem using Newton method. Use stopping criterion: $||\nabla F(x^{k+1}) + A^T \mu_{k+1}|| \leq 10^{-3}$.

a)

$$min\ F(x) = \sum_{i=1}^{5} x_i \log x_i$$

$$s.t\ \sum x_i = 1$$

and choose $x^0 = (1/5, 1/5, 1/5, 1/5, 1/5)$.

b)

$$min\ F(x) = \sum_{i=1}^{4} x_i \exp(-x_i)$$

$$s.t\ x_1 + x_2 + x_3 + x_4 = 1$$

$$x_1 - 2x_2 + 3x_3 - 4x_4 = 0$$

choose $x^0 = (2/3, 1/3, 0, 0)$.

**Q2.** Solve the following problem using log barrier method. Choose $\sigma_0 = 1, R = 10, x^0 \rightarrow$ Strictly feasible point. Stopping criterion $\frac{m}{\sigma_k} < 10^{-3}$

$$min\ F(x) = x_1 + 2x_2 + 5x_3 - 8x_4 + 7x_5 - 11x_6$$

$$s.t\ x_1 - x_2 + x_3 = 0$$

$$x_1 - 2x_2 + 2x_3 + x_4 + x_6 = 3$$

$$2x_3 + x_4 - 5x_5 + x_6 = -2$$

$$x_2 + x_3 + 2x_4 - 3x_5 + 2x_6 = 1$$

$$x_1 + 3x_3 - x_4 + 2x_6 = 2$$

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