MAEG4070 Engineering Optimization

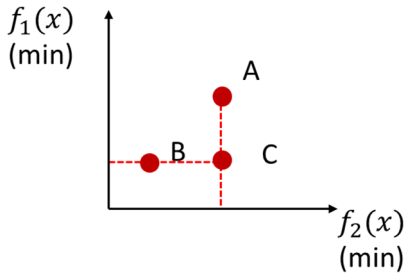
Homework 4

Due: Nov 28, 2022

1. Write down the updates when applying dual decomposition to solve the following optimization problem (20 points). Choose step size $\alpha = 0.1, k = 0,$ and $\lambda^0 = 0$, write down the first two iterations. (30 points)

$$\begin{aligned} \min_{x_1,x_2} \ & 6x_1^2 + 7x_2^2 \\ \text{s.t. } & 3x_1 + 7x_2 = 10 \end{aligned}$$

2. Please tell the relationship between (1) points A and B; (2) points B and C; (3) points A and C. One dominates the other? Or are they non-dominated solutions? (30 points)



3. Is $x^* = (1,2)^T$ a robust feasible solution to the following robust optimization? Explain why. (20 points)

$$\begin{aligned} \min_{x_1,x_2} \ & 3x_1 + 4x_2 \\ \text{s.t. } & ax_1 + x_2 \leq b, \forall a \in \{1,2\}, \forall b \in \{2,3\} \end{aligned}$$