Exercises : Penalization

Exercise 1 (A quadratic example in $\mathbb{R}^2$). *For the following problems*

1. *find the optimal solution using quadratic penalization*

2. *find the optimal solution through KKT conditions*

$$\underset{x_1,x_2\in\mathbb{R}}{\text{Min}} \quad x_1^2 + x_2^2$$
$$\text{s.t.} \quad x_1 + x_2 = 1$$

$$\underset{x_1,x_2}{\text{Min}} \quad x_1^2 + x_2^2$$
$$\text{s.t.} \quad x_1 + x_2 \geq 1$$
$$x_2 \leq 0$$