Example 10. (Page 68). let $C := \mathbb{R}$, $m := 1$ and $p := 0$:

1

$$(P) \begin{cases} f(x) = x + 2010 \longrightarrow \min \\ g(x) = \frac{1}{2}x^2 \leq 0 \end{cases}$$

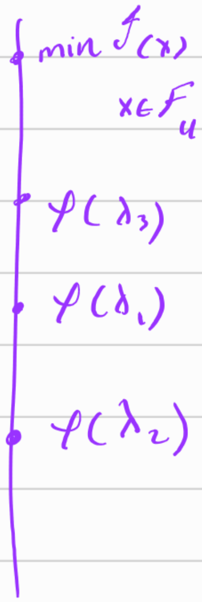
the only feasible region is $x = 0$, $f(0) = 2010$

$$L(x, \lambda) = f(x) + \lambda g(x) = x + 2010 + \frac{\lambda}{2}x^2 \quad (\lambda \geq 0,\ x \in \mathbb{R})$$

$$\partial L(x,\lambda)/\partial x = 1 + \lambda x = 0 \implies x = \frac{-1}{\lambda}$$

$$\rightarrow \varphi(x) = \min_x L(x, \lambda) = \frac{-1}{\lambda} + 2010 + \overbrace{\left(\frac{\lambda}{2}\right)\left(\frac{1}{\lambda^2}\right)}^{\frac{1}{2\lambda}}$$

$$= 2010 - \frac{1}{2\lambda}$$



2

$$(P) \begin{cases} f(x) = \exp(-x) \longrightarrow \min \\ g(x) = -x \leq 0 \end{cases}$$

$$L(x, \lambda) = f(x) + \lambda g(x) = \exp(-x) - \lambda x \quad (\lambda \geq 0)$$