Assignment 9

1. Consider the quadratic programming with box constraint:

$$\min_{x\in\mathbb{R}^N} \frac{1}{2}x^TQx + c^Tx, \quad \text{s.t. } l \le x \le u,$$

where $Q \in \mathbb{R}^{N\times N}$ is symmetric positive-definite, $c \in \mathbb{R}^N$, $l, u \in \mathbb{R}$.

(i) Examine whether this problem satisfies the condition of the Projected Gradient Algorithm.

(ii) Show how to use Projected Gradient Algorithm to solve this problem and give the first two iterations.

2. Consider the linear constrained convex optimization problem:

$$\min_{x\in\mathbb{R}^N} \frac{1}{2}\|x\|_2^2, \quad \text{s.t. } Ax = b,$$

(i) Examine whether this problem satisfies the condition of the Uzawa Algorithm.

(ii) Show how to use Uzawa Algorithm to solve this problem and give the first two iterations.