MATLAB Exercise Problems

- Solve the following unconstrained optimization problem use Quasi-Newton method, and find out how many function evaluations are used.

$$\min_{\mathbf{x}} \ f(\mathbf{x}) = x_1^{\,2} + 3x_2^{\,2} + 6x_1 + 18x_2 + 22\sin(0.1x_1x_2 + 1.5) - 20$$

$$\mathbf{x}_0 = [0, 0]$$

- Solve the following constrained optimization problem use SQP method, and find out how many data points have been used.

$$\min_{\mathbf{x}} \ f(\mathbf{x}) = x_1 + x_2$$

$$s.t. \quad g_i(\mathbf{x}) \le 0, i = 1, 2, 3$$

$$\textbf{where} \qquad g_1 = 1 - x_1^2 x_2 / 20$$

$$g_2 = 1 - \frac{(x_1 + x_2 - 5)^2}{30} - \frac{(x_1 - x_2 - 12)^2}{120}$$

$$g_3 = 1 - 80 / (x_1^2 + 8x_2 + 5)$$

$$\mathbf{x} = [x_1,\ x_2]; \quad x_1 \in [0,\ 10]; x_2 \in [0,\ 10]; \quad \mathbf{x}_0 = [5,\ 5];$$