ME598/494 Homework 5

1. (100 points) Consider the following problem.

$$\begin{aligned} \min\ f &= x_1^2 + (x_2 - 3)^2 \\ \text{s.t. } g_1 &= x_2^2 - 2x_1 \leq 0 \\ g_2 &= (x_2 - 1)^2 + 5x_1 - 15 \leq 0 \end{aligned}$$

Implement an SQP algorithm with line search to solve this problem, starting from $\mathbf{x}_0 = (1, 1)^T$. Incorporate the QP subproblem. Use BFGS approximation for the Hessian of the Lagrangian. Use the merit function and Armijo Line Search to find the step size.

Note: For MAE598, write your own script to solve the QP subproblem with an active-set strategy. For MAE494, use the built-in MATLAB function *quadprog* to solve the QP subproblem.

A template can be found here.