Problem 3: Due February 22 at 10:00 AM

1. Demand: $P(Q) = Q^{-\gamma}$

2. Cost: $C(Q) = \frac{1}{2}\,c\,Q^2$

The firm wishes to maximize its profits. Write a computer program that solves for the optimal quantities given any input vector (γ, c) using:

1. Nelder-Mead (fminsearch in MATLAB)

2. BFGS (fminunc in MATLAB)

Suppose the firm faces a capacity constraint of $Q < \bar{Q}$. Write a computer program that solves for the optimal quantities given any input vector $(\gamma, c, \bar{Q})$ using:

1. Interior point

2. Trust region

3. Active set (all three are in fmincon in MATLAB)

You do not need to code up the algorithms from scratch. Use the optimization routines in MATLAB or a language of your choice.