Advanced Microeconomic Theory

Ran Spiegler

Problem Set no. 4

Problem no. 1 (common-value auction)

Find a symmetric Nash equilibrium in the first-price version of the common-value auction studied in class.

Problem no. 2 (Cournot competition with uncertainty about demand)

Two profit-maximizing firms compete in a market for a homogeneous good, according to the following model. Each firm independently chooses its production quantity. The market price P is determined according to the equation P = A-Q, where Q is the sum of the firms' production quantities, and A is a parameter that gets three possible values, L, M and H, with probabilities 1/2, 1/3 and 1/6, respectively. Firm 1 is informed of whether or not A=L, while firm is informed of whether A=H or not. Formulate this interaction as a Bayesian game and characterize a Nash equilibrium as a function of the underlying parameters. (For simplicity, assume that negative quantities are permissible.)

Problem no. 3 (market entry game)

Two profit-maximizing firms, denoted 1 and 2, simultaneously decide whether to enter a market. When a firm chooses not to enter, it earns zero profits. When a firm enters while its opponent stays out, the firm earns 1-c, where c is an exogenous parameter in (½,1). Finally, when both firms enter the market, firm 1 earns x-2c while firm 2 earns 1-x-2c, where x is an exogenous state of Nature that takes the values 0 and 1 with equal prior probability. Firm 1 knows the value of x. When x=1, firm 2 receives an alert with probability ¾. When x=0, firm 2 receives no alert.

Formulate the interaction as a Bayesian game and characterize its Nash equilibria as a function of c.