Economics 504: Problem Set 2

Static Games

For each of the following games find 1) all weak and strict dominant strategy equilibria 2) apply iterated **strict** dominance 3) find all pure and mixed Nash equilibria 4) indicate which Nash equilibria are trembling hand perfect and why

a)

2,1	0,0
0,0	1,2

b)

6,6	0,7
7,0	1,1

c)

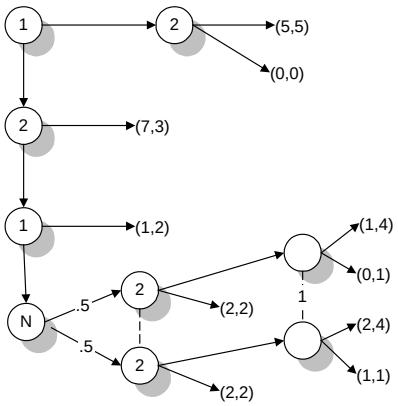
3,3	2,2	1,1
2,2	1,1	0,8
1,1	8,0	0,0

d)

1,3	1,3
0,0	2,0

Dynamic Games

In the game below find 1) the normal form 2) all pure and mixed Nash equilibria 3) all subgame perfect equilibra



Dominance and Nash Equilibrium

Prove that a profile is a Nash equilibrium of a game if and only if it is the Nash equilibrium of the game in which strategies have been removed by iterated strict dominance. Prove that a Nash equilibrium of a game in which strategies have been removed by iterated weak dominance is a Nash equilibrium of the original game. Give an example of a Nash equilibrium of a game that is not a Nash equilibrium of the game where strategies have been removed by iterated weak dominance.

Backward Induction

There are five pirates with names 1,2,3,4,5. They have just seized a hundred gold coins, and now it's time to share the loot. The bargaining rules are: Whoever has the lowest number as a name must propose an division of the one hundred coins to the remaining pirates. If the majority accepts the proposal, then the coins are allocated and the game ends. If the majority does not accept, then the proposer gets thrown overboard and the game is repeated with one less pirate. What should the first pirate propose?

Correlated Equilibrium

Consider the game

0,0	2,1
1,2	0,0

Show that the correlated strategy profile

1/3	1/3
1/3	0

is in fact a correlated equilibrium

Elicitation of Beliefs

An experimental subject believes the probabilities over the finite state space Ω are μ. He is asked to report these probabilities. In an effort to get the subject to report truthfully, the experimenter offers a reward schedule $r(\omega, \tilde{\mu})$ where ω is the realized state of nature, and $\tilde{\mu}$ is the reported probability distribution. Suppose the reward schedule is $r(\omega, \tilde{\mu}) = \tilde{\mu}(\omega)$. What is the optimal report for the subject to make? What if the reward schedule is $r(\omega, \tilde{\mu}) = \log \tilde{\mu}(\omega)$. Is there a connection here with econometric theory?

Risk Aversion in the Lab

From experimental data of Peter Boessarts and Charles Plott, individuals in the laboratory are indifferent between getting nothing, and a gamble paying \$9.75, –\$3.00, –\$2.25 each with probability 1/3. For an individual with CES preferences, find the coefficient of relative risk aversion as a function of wealth, using the approximation

$$p = -\frac{u''(x)}{u'(x)}\frac{\sigma^2}{2}.$$

- If wealth is \$350,000, what is the coefficient of relative risk aversion?
- If the coefficient of relative risk aversion is 20, what is wealth?

AK model

There is a single unit of capital, and an infinite number of time periods $t = 1,2,\ldots$. Utility of the representative consumer is discounted additively separable with discount factor δ and coefficient of relative risk aversion ρ. Capital may be used either to produce consumption or to produce capital for next period. A unit of capital used to produce capital for next period produces $\beta > 1$ units of next period capital.

- Find the optimal steady state growth rate of capital and consumption.
- Find the initial value of the capital stock.
- What happens to the initial value of the capital stock as β increases?
- Interpret your result in terms of the stock market reaction to unanticipated good news.

Investment

An investor may either be wealthy or bankrupt. If he is bankrupt he receives zero and has no choices. If he is wealthy he may choose to invest in stocks or bonds. If he invests in bonds, he remains wealth, but receives a utility of only one. If he invests in stocks, he has a p chance of going bankrupt each period but receives a utility of two. For what values of p, δ should the investor buy stocks?