Spring 2012 – Chesnes
120 Minutes

Economics 644 – Final

Please answer ALL questions on this examination. Be sure to explain any non-standard notation that you use and JUSTIFY your answers. Each question's weight is shown in parentheses. Good Luck!

1. *Bayesian Game (35%).* Consider the following game:

Emily

		Left	Right
John	Up	(2 , 2)	(0 , 2)
	Down	(2 , 0)	(1 , 1)

State 1
Probability = α

Emily

		Left	Right
John	Up	(-2 , -2)	(2 , 0)
	Down	(0 , 2)	(2 , 2)

State 2
Probability = 1- α

For part a, suppose α = 1.

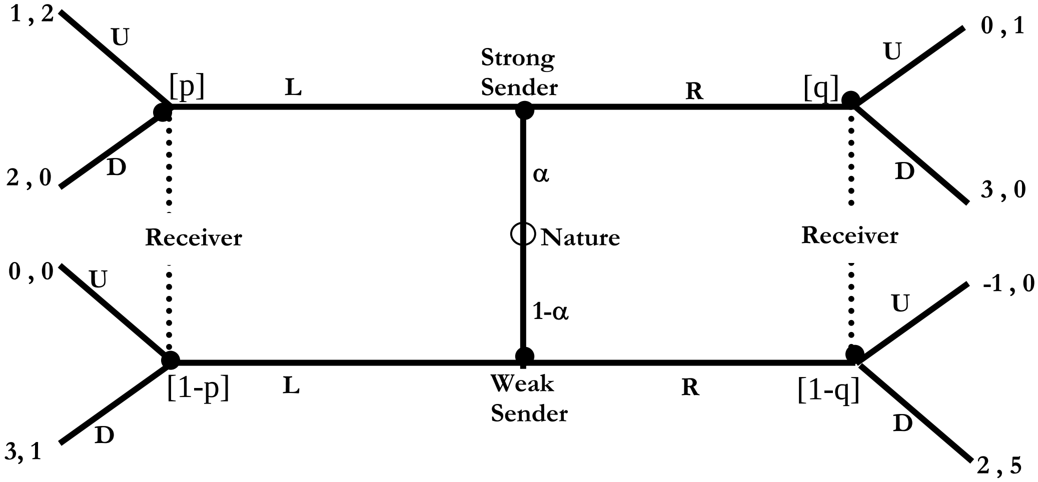
a. Find all Nash Equilibria of the game (i.e., ignoring the game in state 2). Plot the best response correspondences on a graph.

For parts b and c, suppose α = ½. Assume both players are uncertain about the state of the world.

b. How many strategies does John have?

c. Solve for the Bayesian Nash Equilibria of the game.

2. *Signaling (30%).*



a. Find the range of α such that there exists a Perfect Bayesian Equilibrium (PBE) involving the strategies (R,R) and (U,D) for the sender and receiver respectively.

b. Now suppose α = 0.5. Solve for a pooling PBE involving both types of sender playing L.

c. How many information sets does each player have?

3. ***Repeated Games (35%).*** **Consider the following stage game, G:**

Player 2

		Left	Right
Player 1	Up	(Y , B)	(0 , A)
	Down	(X , 0)	(Z , C)

Assume X > Y > Z > 0 and A > B > C > 0. Note the payoff for player 2 if (Down, Left) is played is zero and the payoff for player 1 if (Up, Right) is played is zero.

a. **Find the Nash Equilibrium of the simultaneous static game.**

b. **Write down Grim-Trigger strategies for each player to sustain (Y,B) as the average per-period payoff of $G(\infty,\delta)$, where $\delta = (\delta_1, \delta_2)$. I.e., players 1 and 2 may have different discount factors.**

c. **Solve for the critical discount factors, $\delta^* = (\delta_1^*, \delta_2^*)$, such that cooperation [playing (Up, Left) in all periods] is optimal for both players.**

d. **Solve for the critical discount factors (δ_1^*, δ_2^*), assuming the following values:**

A = 30	X = 40
B = 25	Y = 20
C = 5	Z = 10

Which player is required to be more patient in order for no deviations to occur? Explain the intuition behind this result given the values for each variable.