Meng-Yu Liang due date: December 29, 2010

IO (I) 323 M2510
Homework #3

Two players are deciding whether to invest. There is a safe action β (not invest); there is a risky action α (invest) which gives a higher payoff if the other player invests. Payoffs are given by the following matrix.

	Invest (α)	Not Invest (β)
Invest (α)	θ, θ	$\theta - 1$, 0
Not Invest (β)	0, $\theta - 1$	0, 0

If there were complete information about θ, there would be three cases to consider.
- If $\theta > 1$, each player has a dominant strategy to invest.
- If $\theta \in [0, 1]$, there are two pure strategy Nash equilibria: both invest and both not invest.
- If $\theta < 0$, each player has a dominant strategy not to invest.

1. Using the notation in Carlsson and van Damme (EM 1993), find the following *Intervals* : G^{γ}, D_i^{α}, D_i^{β}, R^{α}, R^{β}, and G_i^{+}.

Suppose there is incomplete information about θ. Player i observes a private signal $x_i = \theta + \varepsilon_i$. Each ε_i is independently uniformly distributed over the interval $[-\varepsilon, \varepsilon]$. We assume that θ is randomly drawn from the interval $[a, b]$, with each realization equally likely.

2. For $a = -1$, $b = 2$ and $\varepsilon \leq \frac{1}{8}$, find $S_i^{\varepsilon,n}$, $A_i^{\varepsilon,n+1}$ and $B_i^{\varepsilon,n+1}$ for $n = 1, 2, \ldots, \infty$.

3. For $a = -1$, $b = 1$ and $\varepsilon \leq \frac{1}{8}$, find $S_i^{\varepsilon,n}$, $A_i^{\varepsilon,n+1}$ and $B_i^{\varepsilon,n+1}$ for $n = 1, 2, \ldots, \infty$.

1. For $a = -\frac{1}{2}$, $b = \frac{3}{2}$ and $\varepsilon = 1$, find $S_i^{\varepsilon,n}$, $A_i^{\varepsilon,n+1}$ and $B_i^{\varepsilon,n+1}$ for $n = 1, 2, \ldots, \infty$.