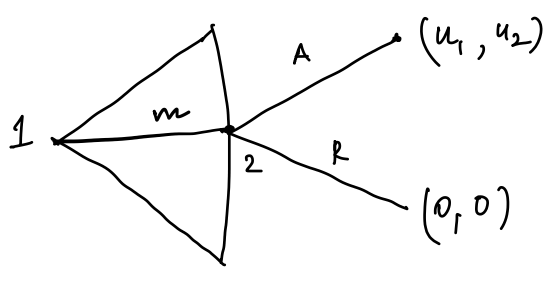
Week 8

Tuesday, 17 September 2024 17:14

Ex 1



$u_1 = 1-m$

$u_2 = m + a(m-(1-m))$

$u_2 = m + a(2m-1)$

$\therefore$ Player 1 will offer a quantity m so that u_2 is just greater than zero.

$u_2 \geq 0$

$m + a(2m-1) \geq 0$

$\Rightarrow m(2a+1) - a \geq 0$

$\Rightarrow m \geq \dfrac{a}{2a+1}$ ——(1)

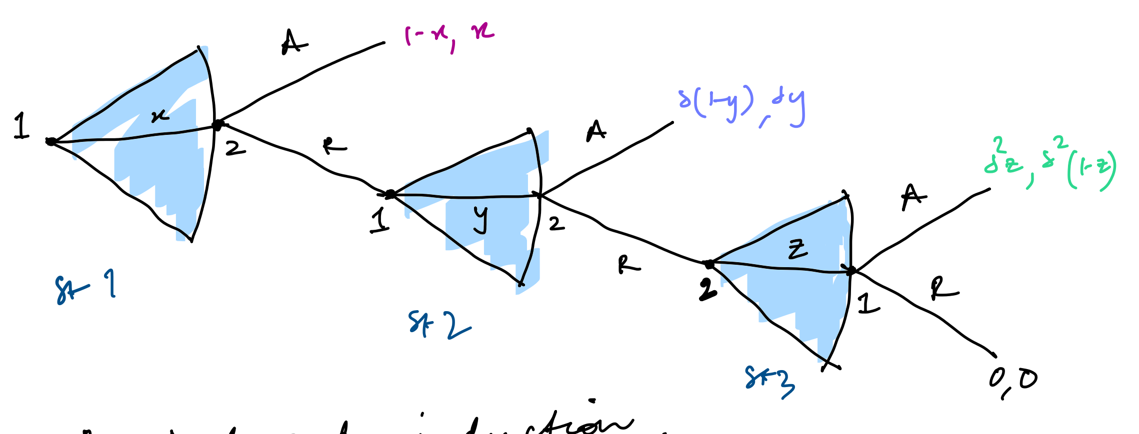
$\therefore$ Pl 1 offers m as per eqn (1).

when a is very large:

$m = \dfrac{a}{2a+1} = \dfrac{1}{1/a + 2}$

$\lim\limits_{a\to\infty} m = \lim\limits_{a\to\infty} \dfrac{1}{1/a+2} = \dfrac{1}{2}$

Ex 2

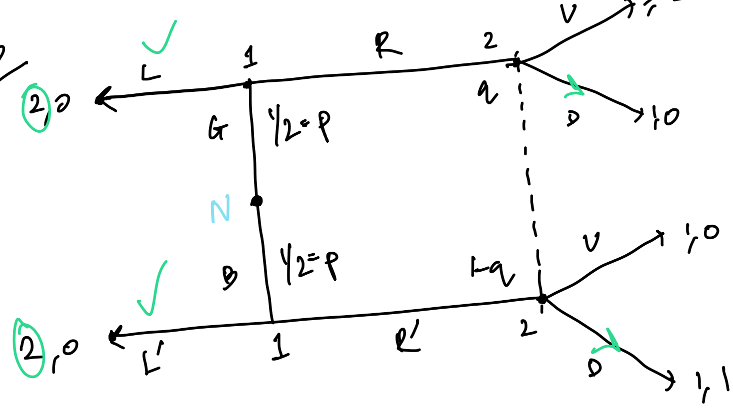


By backward induction,

- in stage 3, pl 2 offers $z=0$ & keeps $\delta^2 \times (1-z) = \delta^2$ as payoff.
- in stage 2, pl 1 will offer y s.t. $\delta y = \delta^2 \Rightarrow y = \delta$
- in stage 1, pl 1 will offer x s.t., $x = \delta y = \delta^2$

$\therefore$ SPNE is that player 1 offers $x = \delta^2$ & both get payoff of $(1-\delta^2, \delta^2)$ respectively.

Ex 3



Separating Eqbm:

- LR'
- L'R

- Taking the possibility of LR' as eqbm.

If R' gets played, player 2 knows that player 1 is of type B.

$\therefore 1-q = 1 \Rightarrow q = 0$

Player 1 will not choose R' because L' gives him a higher payoff. whereas player 1 <u>will</u> choose L, which gives him higher payoff when player 2 is choosing D.

$\therefore$ LR' is <u>not</u> an eqbm.

- Taking the possibility of L'R as an eqbm.

$\therefore q = 1$

Player 2 chooses U based on $q=1$

$\therefore$ Player 1 gets payoff $= 3$ when player 2 chooses U & $\therefore$ pl 1 chooses R, not L.

In the other continuation game, for U by player 2, player 1 gets 1 for playing R', whereas he gets 2 for playing L'.

$\therefore$ Player 1 chooses L'.

$\therefore$ (L'R, U) <u>is</u> an eqbm.

Pooling Eqbm:

- LL'
- RR'

- Taking RR' as a possible eqbm.

Player 2 has no new information.

$\therefore p = q = 1/2$

If he chooses $U \longrightarrow 2q + 0\times(1-q) = 2q = 1$

$D \longrightarrow 0\times q + 1\times(1-q) = 1-q = 1/2$

Player 1 gets payoff 3 for strategy U of player 2 in the first cont game.

But in second cont game, he gets higher payoff for L' (not R').

$\therefore$ RR' is <u>not</u> an eqbm.

- Taking LL' as a possible eqbm

then player 2 has no direct action & $\therefore$ he has no prior for q.

considering the payoff of player 2 in both cont games.

$U \longrightarrow 2q + 0(1-q) = 2q$

$D \rightarrow 0\times q + 1\times(1-q) = 1-q$

If $2q > 1-q \Rightarrow$ he chooses U.

$\Rightarrow 3q > 1$

$\Rightarrow q > 1/3$

If $q < 1/3$, pl 2 chooses D.

If $q = 1/2$ he's indifferent b/w U & D.

Payoff of player 1:

If pl 2 chooses U (i.e. $q > 1/3$) $\longrightarrow$ player 1 gets higher payoff for R in first cont game. $\therefore$ LL' cannot be an eqbm.

If pl 2 chooses D (ie $q < 1/3$) $\longrightarrow$ player 1 gets higher payoff for both L & L' in both cont games. $\therefore$

(LL', D) for $q < 1/3$ <u>is</u> an eqbm.

If $q = 1/3$, avg payoff of player 1 when he plays R is 2 & L is also 2. $\therefore$ both are best response.

& when he's of type B, L gives higher payoff.

$\therefore$ (LL', U) & (LL', D) are both eqbm for $q = 1/3$.