

		Coy	Female Fast
1	Female	(2, 2)	(5, 5)
	Male		
	Phil	(0, 0)	(15, 5)

(15-20, since she takes on entire cost)

No Pure NE

Mixed equilibrium or mixed E.S.S. is one that equalizes ^{expected} payoffs for coy & fast females

Say males are faithful with prob. p & philandering w.p. $1-p$.

Then expected payoff to coy female = $2p$

" " " fast female = $5p - 5(1-p)$

Equating them:

$$2p = 5p - 5(1-p)$$

$$= 5p - 5 + 5p \Rightarrow p = 5/8$$

So an ESS (NE) for males is

$5/8 = P(\text{faithful})$, $3/8 = P(\text{philandering})$.

$(5/8, 3/8)$

2. 4.4
108.

		II	
		A	B
I	A	(4, 4)	(2, 5)
	B	(5, 2)	(3, 3)

Pure NE: (3, 3)

Mixed Let $P(\text{PI plays A}) = p, 0 < p < 1$

then need p s.t.

$$4p + 2(1-p) = 5p + 3(1-p)$$

$$4p + 2 - 2p = 5p + 3 - 3p$$

$$\Rightarrow 2 = 3 \quad \times$$

so, cannot have $0 < p < 1$

\Rightarrow Only one NE at (3, 3) so NE given by (\bar{p}, \bar{q}) where $\bar{p} = \bar{q} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

Checking payoffs to see if ESS.

$$\text{Let } z = \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad z^T A p = (1 \ 0) \begin{pmatrix} 4 & 2 \\ 5 & 3 \end{pmatrix} \begin{pmatrix} 0 \\ 1 \end{pmatrix} = (4 \ 2) \begin{pmatrix} 0 \\ 1 \end{pmatrix} = 2$$

$$p^T A p = (0 \ 1) \begin{pmatrix} 4 & 2 \\ 5 & 3 \end{pmatrix} \begin{pmatrix} 0 \\ 1 \end{pmatrix} = (5 \ 3) \begin{pmatrix} 0 \\ 1 \end{pmatrix} = 3$$

Let $z = \begin{pmatrix} 0 \\ 1 \end{pmatrix} = p$ so $p^T A p = z^T A p = z^T A z$

so cannot have condition (ii) in defn of ESS.

\therefore Not ESS.

2 : cont'd

		II	
		A	B
I	A	(4, 4)	(3, 2)
	B	(2, 3)	(5, 5)

2 Pure NE at (A, A) & (5, 5)
So strategies (1, 0) & (0, 1)

Mixed : Let $P(\text{PI plays A}) = p$

$$\therefore \text{Need: } 4(p) + 3(1-p) = 2p + 5(1-p) \\ \Rightarrow p = 1/2$$

Mixed NE at $(\frac{1}{2}, \frac{1}{2})$

Check ESS : Let $z_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$ & $z_2 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

For each strategy x , need to check -

(i) $x^T A x \geq z_i^T A x$

(ii) if $x^T A x = z_i^T A x$, then check $x^T A z_i \geq z_i^T A z_i$

check for $x = (1, 0)$, $(0, 1)$. These cannot be ESS since (ii) does not hold.

check $x = (\frac{1}{2}, \frac{1}{2})$

$$\begin{pmatrix} \frac{1}{2} & \frac{1}{2} \end{pmatrix} \begin{pmatrix} 4 & 3 \\ 2 & 5 \end{pmatrix} \begin{pmatrix} \frac{1}{2} \\ \frac{1}{2} \end{pmatrix} = 7/2, \quad z_1^T A x = 7/2, \quad x^T A z_1 = 3 \\ z_1^T A z_1 = 4 \quad \Rightarrow \text{Not ESS.}$$

3.

F: fish fresh

O: fish old.

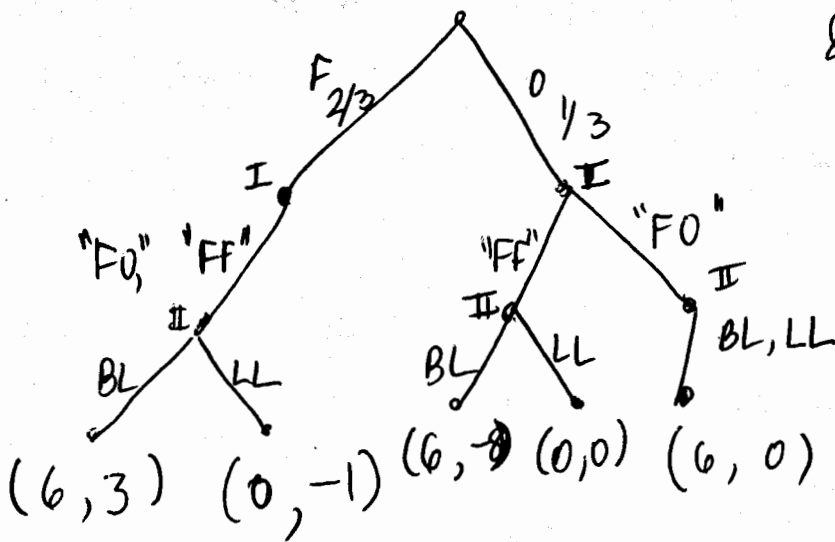
"FF": seller claims fresh

"FO": seller tells truth

"BL": Buys if fresh & leaves fold.

"LL": leave without buying.

Let P I be seller
& P II be buyer.



		Buyer	
		"BL"	"LL"
Seller	"FF"	(6, -2/3)	(0, -2/3)
	"FO"	(6, -2/3)	(2, -2/3)