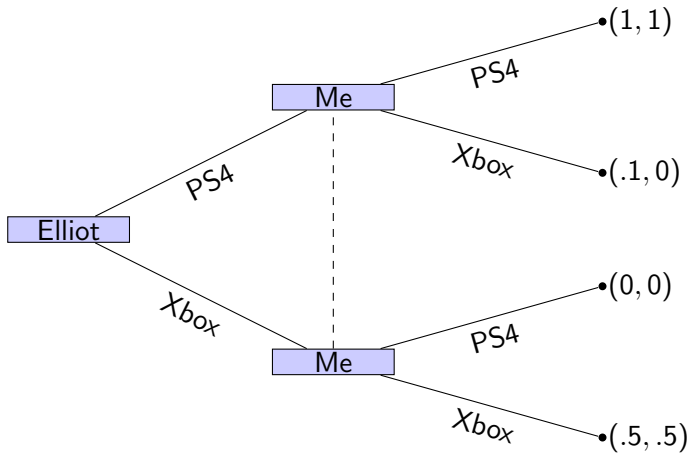


Next generation consoles and an introduction to normal form games

Game Theory

Vincent Knight

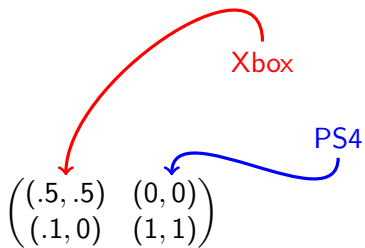


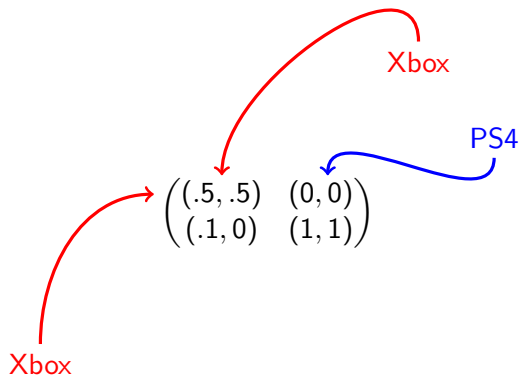
- ▶ A finite set of N players: Elliot and I.
- ▶ Strategy spaces for the players: $S_1, S_2, S_3, \dots, S_N$ -
 $S_1 = S_2 = \{\text{Xbox}, \text{PS4}\}$.
- ▶ Payoff functions for the players: $u_i : S_1 \times S_2 \cdots \times S_N \rightarrow \mathbb{R}$

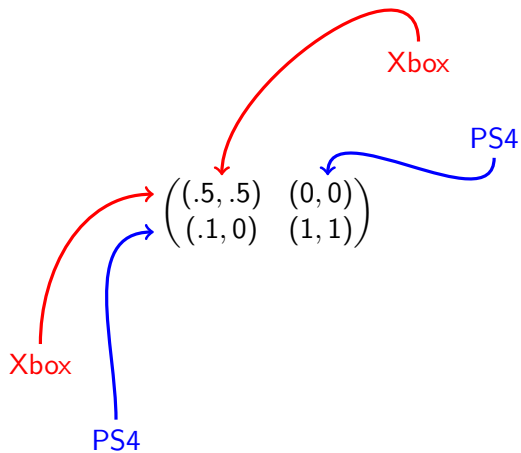
$$\begin{pmatrix} (.5, .5) & (0, 0) \\ (.1, 0) & (1, 1) \end{pmatrix}$$

Xbox

$$\begin{pmatrix} (.5, .5) & (0, 0) \\ (.1, 0) & (1, 1) \end{pmatrix}$$







Mixed strategy: σ_i

$$\sum_{i=1}^{|S_i|} \sigma_i = 1$$

$$\sigma_1 = (.3, .7) \text{ and } \sigma_2 = (.8, .2)$$

$$\begin{pmatrix} (.5, .5) & (0, 0) \\ (.1, 0) & (1, 1) \end{pmatrix}$$

$$\begin{aligned} u_1(\sigma_1, \sigma_2) &= \sum_{r \in S_1, s \in S_2} \sigma_1(r) \sigma_2(s) u_1(r, s) \\ &= .3 \times .8 \times .5 + .3 \times .2 \times 0 + .7 \times .8 \times .1 + .7 \times .2 \times 1 = .19 \end{aligned}$$

$$\begin{aligned} u_2(\sigma_1, \sigma_2) &= \sum_{r \in S_1, s \in S_2} \sigma_1(r) \sigma_2(s) u_2(r, s) \\ &= .3 \times .8 \times .5 + .3 \times .2 \times 0 + .7 \times .8 \times 0 + .7 \times .2 \times 1 = .134 \end{aligned}$$

What happens when I 'always' buy an Xbox?