

2-3-BoS-Comput...







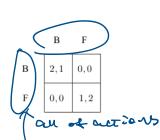
Computing Mixed Nash Equilibrium (1)

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Game Theory Course: Jackson, Leyton-Brown & Shoham

Computing Mixed Nash Equilibria

Battle of the Sexes

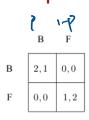




- It's hard in general to compute Nash equilibria, but it's easy when you can guess the support jet of actions
- For BoS, let's look for an equilibrium where all actions are part of the support

Computing Mixed Nash Equilibria

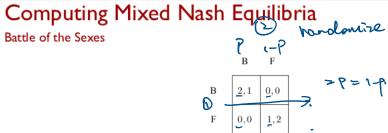
Battle of the Sexes





- Let player 2 play B with p, F with 1-p.
- If player 1 best-responds with a mixed strategy, player 2 must make him indifferent between F and \overline{B} (why?)

play. b. F Gometimes - BR - ; indifferent. EX. @ Botter more u on is, dess Utility on F -> Futility 20





- Let player 2 play B with p, F with 1-p.
- If player I best-responds with a mixed strategy, player 2 must

make him indifferent between F and B (why?)

With a player 1 response with $u_1(B) = u_1(F)$

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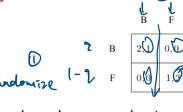




- Likewise (player I) must randomize to make (player 2 in) different.
 - Why is player I willing to randomize?

Computing Mixed Nash Equilibria

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- Likewise, player 1 must randomize to make player 2 indifferent.
- Why is player I willing to randomize?
- Let player I play B with q, F with 1-q. Then $(\gamma, (-\gamma))$ $u_2(B) = u_2(F)$

q + 0(1 - q) = 0q + 2(1 - q)

• Thus the mixed strategies $(\frac{2}{3},\frac{1}{3})$, $(\frac{1}{3},\frac{2}{3})$ are a Nash equilibrium.

10 Dehiguay , made other NE.

Interpreting Mixed Strategy Equilibria

What does it mean to play a mixed strategy? Different interpretations:

- Randomize to confuse your opponent · consider the matching pennies example
- Randomize when uncertain about the other's action find in balance.
 consider battle of the sexes dithe preference and up better Mixed strategies are a concise description of what might happen
- in repeated play: count of pure strategies in the limit

 Mixed strategies describe population dynamics: 2 agents chosen from a population, all having deterministic strategies. MS gives the probability of getting each PS.