Pirate Games

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Goal = Call
your atteution
to Game Theory

Pirate Game

$N = \{1, \ldots, n\}$ pirates

$\mathcal{N} = (G=(V,E), a_e, b_v)$

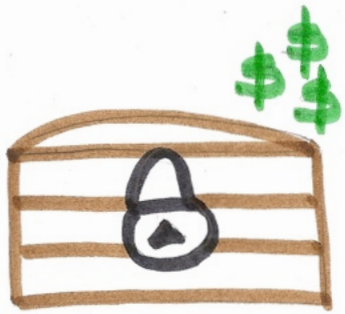
$s_1, s_2, \ldots$ = sources

u_i = utility function

Outcome

$$\pi = (p_1, p_2, \ldots, p_n)$$

path in G



2 Models

Fair (A)

Unfair (B)

bu divided

first-in
keep bu

Pure Nash Equilibrium

(PNE)

$$\pi = (p_1, p_2, \ldots, p_n)$$

s.t. $u_i(\pi) \geq u_i(p_1, p_2, \ldots, p_i', \ldots, p_n)$

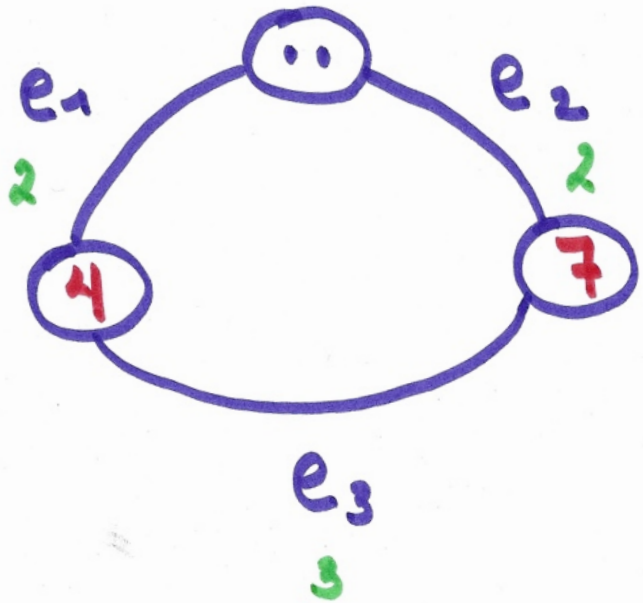
for each i

for any π'

Results

(A)
- graphs → NCG → PNE
- digraphs → CG → PNE
  - ↳ greedy

(B)
- layered: ⟺ (A) → PNE
- not. layered → not PNE in general



P_1 \ P_2	e_1	e_2	e_1e_3	e_2e_3
e_1	(0,0)	(2,5)	(0,4)	(2,2)
e_2	(5,2)	(1.5,1.5)	(5,-1)	(1.5,2.5)
e_1e_3	(4,0)	(-1,5)	(0.5,0.5)	(-1,2)
e_2e_3	(2,2)	(2.5,1.5)	(2,-1)	(0.5,0.5)

Open Questions:

- Conditions for PNE in (B)
- Random graphs, expected u_i
- Other models, u_i def.
- Probability over strategies
- More games

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