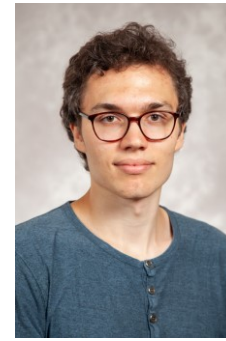


Complexity of imperfect-recall equilibrium concepts



Emanuel
Tewolde



Caspar
Oesterheld



Paul
Goldberg



Manolis
Zampetakis



Brian Zhang



Tuomas
Sandholm

Emanuel Tewolde, Caspar Oesterheld, Vincent Conitzer, and Paul Goldberg. [The Computational Complexity of Single-Player Imperfect-Recall Games](#). IJCAI'23

Emanuel Tewolde, Brian Zhang, Caspar Oesterheld, Manolis Zampetakis, Tuomas Sandholm, Paul Goldberg, and Vincent Conitzer. [Imperfect-Recall Games: Equilibrium Concepts and Their Complexity](#). IJCAI'24

CDT+Thirding

EDT+Halving

Ex ante optimal

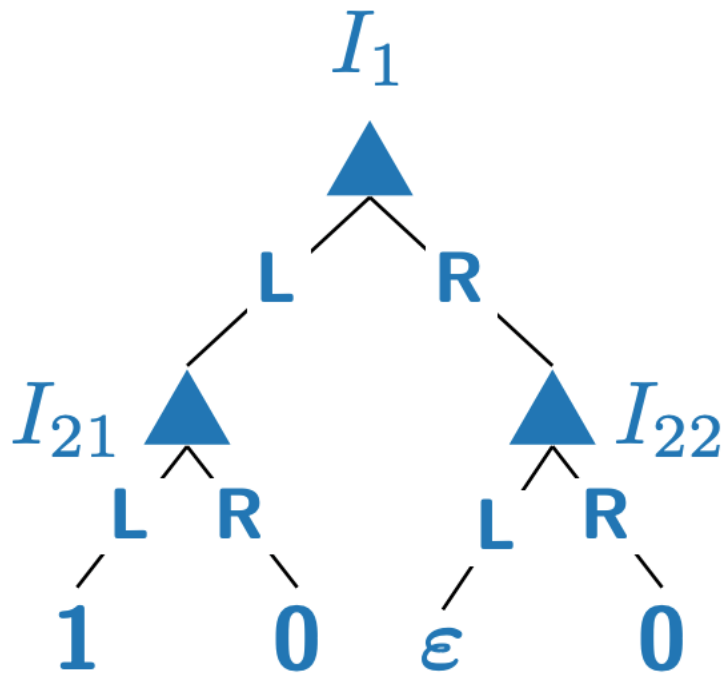
CLS-complete*

PLS-complete*

NP-hard*

**under conditions / greatly oversimplifying*

Equilibrium Refinement for Imperfect Recall



- Task: Study our fix of issues arising with some equilibrium concepts
- **Theory** project
- with a significant component in nonlinear optimization

Bridge



- 2-player vs 2-player card game
- Classical, but yet unsolved testbed for game-playing AI
- **Coding** project using optimization and/or reinforcement learning

google-deepmind/ **open_spiel**



OpenSpiel is a collection of environments and algorithms for research in general reinforcement learning and search/planning in games.

182
Contributors

21
Issues

28
Discussions

4k
Stars

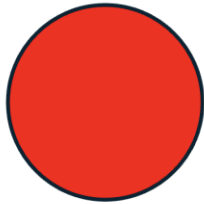
949
Forks



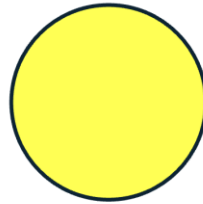
https://github.com/google-deepmind/open_spiel

Symmetries in Sequential Games

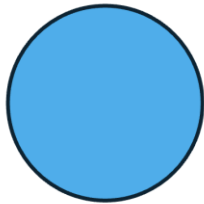
10 points



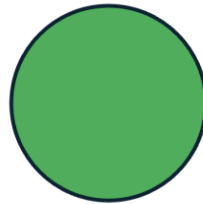
12 points



12 points



12 points



<https://www.walmart.com/ip/Hanabi-The-Collaborative-Classic-Card-Game-by-R-R-Games/40478451>

- **Theory and Coding** project in reinforcement learning

Emanuel Tewolde, Brian Hu Zhang, Caspar Oesterheld, Tuomas Sandholm, and Vincent Conitzer. [Computing Game Symmetries and Equilibria That Respect Them AAI'25](#)