

# On Markov Perfect Equilibria in Discounted Stochastic ARAT Games

Anna Jaśkiewicz and Andrzej S. Nowak

This talk is concerned with discounted stochastic games with additive rewards and transitions (*ARAT*) structure. The transition probabilities are dominated by some probability measures on a general state space and are norm continuous in actions of the players. The existence of Markov perfect equilibria is proved. In the equilibrium, the players can use randomisation on two pure actions in each state. When the state space is countable, then a pure Markov perfect equilibrium exists. In addition if the transition probabilities have no conditional atoms, some existence results on pure Markov perfect equilibria for *ARAT* games with uncountable state space are established using a version of Lyapunov's theorem for conditional expectation of correspondences due to Dynkin and Evstignejev. This talk is based on work [1].

## References

- [1] A. Jaśkiewicz, A.S. Nowak *On Markov Perfect Equilibria in Discounted Stochastic ARAT Games*, SIAM J. Control Optim. (2024), to appear.

**First Author:** Anna, Jaśkiewicz

**Affiliation:** *Wydział Matematyki, Politechnika Wrocławska  
50-370, Wrocław, Polska*

**e-mail:** `anna.jaskiewicz@pwr.edu.pl`

**Second Author:** Andrzej S., Nowak

**Affiliation:** *Wydział Matematyki, Informatyki i Ekonometrii, Uniwersytet Zielonogórski  
65-417 Zielona Góra, Polska*

**e-mail:** `a.nowak@wmie.uz.zgora.pl`