Asymptotic analysis of discounted zero-sum repeated games: some recent advances

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Abstract

The existence of a limit for the values of discounted zero-sum repeated games has been established for finite stochastic games and games with incomplete information on both sides (with state independent or symmetric signals). Recent results show that this property holds for absorbing or recursive games with compact action spaces (Sorin and Vigeral, 2013a) but does not extend to general stochastic games (Vigeral, 2013). Similar striking counter examples have been obtained for finite "stochastic games with symmetric signals" (Ziliotto, 2013). We will exhibit a class of models linking these results and explaining the rôle of reversibility and oscillations (Sorin and Vigeral, 2013b).

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References

[1] Aumann R.J. and M. Maschler (1995). *Repeated Games with Incomplete Information*, M.I.T. Press.

[2] T. Bewley and E. Kohlberg, The asymptotic theory of stochastic games. *Mathematics of Operations Research* **1** (1976) 197-208.

[3] Kohlberg, E. and S. Zamir (1974). Repeated Games of Incomplete Information: The Symmetric Case. *Annals of Statistics*, **2**, 1040.

[4] Mertens J.-F. and S. Zamir (1971). The value of two-person zero-sum repeated games with lack of information on both sides. *International Journal of Game Theory*, **1**, 39-64.

[5] A. Neyman and S. Sorin (eds.) (2003) *Stochastic Games and Applications*, Kluwer Academic Publishers.

[6] Shapley L. S. (1953). Stochastic games. *Proceedings of the National Academy of Sciences of the U.S.A.*, **39**, 1095-1100.

[7] Sorin S. (2002). *A First Course on Zero-Sum Repeated Games*. Springer.

[8] S. Sorin and G. Vigeral (2013a) Existence of the limit value of two person zero-sum discounted repeated games via comparison theorems. *Journal of Opimization Theory and Applications* **157** , 564-576.

[9] S. Sorin and G. Vigeral (2013b) Reversibility and oscillations in zero-sum discounted stochastic games,hal-00869656.

[10] G. Vigeral (2013) A zero-sum stochastic game with compact action sets and no asymptotic value, *Dynamic Games and Applications*, **3**, 172-186.

[11] B. Ziliotto (2013) Zero-sum repeated games: counterexamples to the existence of the asymptotic value and the conjecture maxmin=$\lim v_n$, hal- 00824039.