N-Person Dynamic Stackelberg Difference Games with Open-Loop Information Pattern

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Abstract. In this paper, extensions are presented for the open-loop Stackelberg equilibrium solution of n-person discrete-time affine-quadratic dynamic games of prespecified fixed duration, concerning the number of followers and the possibility of an algorithmic disintegration.

The given results extend the current state of research which is defined by the results for one leader and one follower that are given in T. Başar and G. Olsder [1].

First we prove a general result about the existence of a Stackelberg equilibrium solution with one leader and arbitrarily many followers in n-person discrete-time deterministic infinite dynamic games of prespecified fixed duration with open-loop information pattern. Then this result is applied to affine-quadratic games. First a proof geared to the one indicated in Başar and Olsder (1999, p. 372)[1] is presented. But this proof "produces" a hardly algorithmically solvable system of equilibrium equations. Therefore we show another way of derivating the equilbirium solution. Thereby we get a system of equilibrium equations that can easily be used for an algorithmic disintegration of the given Stackelberg game.

Key words: Dynamic game theory, noncooperative games, difference games, affine-quadratic games, Stackelberg equilibrium

References

1. BAŞAR, T., AND OLSDER, G. J. *Dynamic Noncooperative Game Theory*, 2 ed. SIAM, Philadelphia, 1999.