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THE NASH EQUILIBRIUM IN OPEN LOOP LINEAR QUADRATIC GAMES FOR POSITIVE SYSTEMS*

Neli Baeva †

Abstract

We consider two-player linear quadratic differential games for positive linear systems with an open loop information structure. The Newton method to obtain the stabilizing solution of a corresponding Riccati equation is presented in the literature. Here, we propose a new iterative method, where the Sylvester iteration to a decoupled Riccati equation is applied. Moreover, the convergence properties of this modification are investigated and the sufficient condition to apply the modification is derived. The performances of the proposed algorithm are illustrated on some numerical examples.

MSC: 15A24, 15A45, 60H35, 65C20.

keywords: open loop Nash equilibrium, generalized Riccati equation, stabilizing solution, nonnegative solution.

1 Introduction

The problem to compute the stabilizing nonnegative solution to the set of Riccati equation is an important problem with many practical applications. Our investigation is motivated from the paper of Jank and Kremer [10] and the paper of Azevedo-Perdicoulis and Jank [1], where the problem of finding

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†nelilnb@abv.bg Technical University of Varna, 1 Studentska str., Varna 9010, Bulgaria.