

BlueBEAR provides a substantial computing resource that properly supports the research work of research staff and students at Birmingham. It provides a cost effective facility that optimises the effectiveness of research and ensures the University continues to be a world-class academic learning and research environment.

Asymmetric Markov perfect equilibria in linear quadratic differential games



Challenges

Differential games allow modelling of environments that are influenced over time by the agents residing in them. Standard applications include fisheries problems (in which fishing effort alters the fish stock) and greenhouse gas problems (in which emissions influence the atmospheric GHG stock). Within this broad class of games, the linear quadratic specification has become a workhorse model due to its analytical tractability. Furthermore, it yields well-known linear solutions. More recently, there has also been interest in its non-linear solutions in symmetric environments (e.g. those in which all agents are identical, and behave identically). We wish to understand whether these solutions survive in more realistic asymmetric environments.

Background

C code has been written to apply finite difference methods to candidate solutions to the linear quadratic differential game. Running this on BlueBEAR allows rapid assessment of candidate paths.

Results

To date, no evidence of asymmetric non-linear solutions have been found. This is good news from a computational point of view as it suggests that analysis of asymmetric linear-quadratic differential games can be confined to a search for linear solutions, an easy task.



Client Profile

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Product Used

C compiler, NAG C libraries

Funding

Departmental funds

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