

Uncertain Differential Game with Risk Averse Players

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Abstract: Uncertain differential game investigates interactive decision making of players over time, in which the system dynamics is governed by a set of uncertain differential equations. In order to incorporate the risk averse behavior of players, this paper introduces the concept of risk averse index and the uncertain differential game with risk averse players. A sufficient condition is provided to guarantee a feedback Nash equilibrium for the general multiplayer nonzero-sum game, while a max-min theorem is obtained to ensure a saddle point for the two-player zero-sum game. As an application, a resource extraction problem with risk averse players is analyzed using the proposed formulation and theorems. The risk averse index exhibits a direct impact on the feedback equilibrium. Unlike uncertain differential game model with risk neutral players, the feedback equilibrium are affected by the diffusion parameter in the uncertain system dynamics.

Biography : Jinwu Gao received the B.S. degree in Mathematics from Shaanxi Normal University, Xian, China in 1996, and the M.S. & Ph.D. degrees in Mathematics from Tsinghua University, Beijing, China, in 2005.

He is currently an associate professor with School of Information, Renmin University of China. His current research interests include fuzzy systems, uncertain systems and their application in optimization, game theory and finance. He has authored or co-authored more than fifty papers that have appeared in *IEEE Transactions on Fuzzy Systems*, *Fuzzy Optimization and Decision Making*, *Journal of Intelligent Manufacturing*, *Soft Computing*, *International Journal of Uncertainty, Fuzziness & Knowledge-Based Systems*, *Computer & Mathematics with Applications* and other publications.

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