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DEDUCING SPACECRAFT INCOMPLETE-INFORMATION PURSUIT-EVASION GAMES USING
PARTIAL OBSERVATIONS**Abstract**

A central challenge in spacecraft incomplete-information pursuit-evasion games is how to identify the unknown opponent's cost function, which reflects the game intention and directly derives the control policy. This study focuses on solving such problem using partial state observations, avoiding relying on hard-acquired precise velocity information. We formulate it as an imitation learning problem subject to the output feedback dynamics, where the pursuer aims to re-construct an equivalent game to the evader, such that the re-constructed game can always mimic the evader's control actions. Specifically, we first establish the feasible solution space for identification. Further, we propose valid iteration algorithm, such that given any initial game formulated by feasible parameters, the convergence to an equivalent game with respect to the evader can be achieved while ensuring the stability of the system, i.e., realization of capture. Numerical simulations show our method has less restriction and better adaptability, compared with existing studies.