

# **Differential Games with incomplete asymmetric information on the initial condition**

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We investigate a two-players zero-sum differential game with an incomplete information. The first player has a complete information on the initial state of the game while the second player has only an information of probabilistic nature: he knows a probability measure on the initial state. The existence of a value for such game was obtained only when the probability measure has a finite support. Such differential games with finite type incomplete information can be viewed as a generalization of the famous Aumann-Maschler theory for repeated games.

The main goal and novelty of the present work consists in obtaining and investigating a Hamilton Jacobi Isaacs Equation satisfied by the upper and the lower values of the game. Since we obtain an uniqueness for such Hamilton Jacobi equation, as a byproduct, this gives the existence of a value of the differential game. Since the Hamilton Jacobi equation is naturally stated in the space of probability measures, we use the Wasserstein distance and some tools of optimal transport theory.