Vladimir M. Veliov (vveliov@eos.tuwien.ac.at), Institute for Econometrics, Operations Research and Systems Theory, Vienna University of Technology, Vienna, Austria, and Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Sofia, Bulgaria, *Optimal Control of Uncertain Systems with Incomplete Information for the Disturbances*

We investigate the problem of optimization of a terminal cost function for a system depending on a control, and on two disturbances for which a priori set-membership is known. The disturbances are of different nature: one becomes known to the controller at the current time (we called it observable), while the other remains unknown. The problem can be viewed as a differential game of min-max type where the controller aims at minimization of the objective function by a strategy which depends only on the observable disturbance. Since the state of the system is not exactly known due to the presence of a unobservable disturbance, we reformulate the problem through a set-valued dynamics describing the evolution of the current set-estimation of the state. To reduce the complexity of the problem we pass to a sub-optimal problem where the evolution of the state estimation is restricted to a prescribed collection of sets. The main result of the paper is a characterization of the value function of this problem trough a Hamilton-Jacobi inequality in terms of Dini derivatives, which implies a convergent scheme for numerical computations. As necessary auxiliary tools we provide new results on evolution and viability of tubes in a given collection of sets, that may be of independent interest.