

Mortensen observer for sub-differential dynamics

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In his 1968 article, Mortensen proposed a recursive method to compute a causal estimator for observed deterministic dynamics. Using tools from control theory, his approach relies on a “cost-to-come” value function that solves a Hamilton-Jacobi-Bellman (HJB) equation in the viscosity sense. This latter function can also be computed from the stochastic filtering setting using a vanishing noise procedure. This talk proposes an adaptation of Mortensen’s approach to sub-differential dynamics defined through variational inequalities. We introduce a suitable notion of cost-to-come function that solves a HJB equation with Neumann boundary condition in the viscosity sense, and we define a Mortensen observer from it. We eventually link the cost-to-come function for this constrained setting to its stochastic filtering counterpart.

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