Parameter Estimation of a Dynamic System Using VSPODE

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In initial value problems for ODE's with uncertainty on some parameters and/or initial conditions, much work has been done to find an enclosure of all possible solutions to the ODE system [2]. However, less work has been done in the inverse problem, which consists in estimating the initial conditions of a phenomenon whose observations are available up to some time t (diagnosis), to then be able to reconstruct its behavior, beyond t (prognosis) [3].

In this talk, we use VSPODE (Validation Solver for Parametric ODE's) [1], which uses automatic differentiation and interval Taylor expansions to handle uncertainty in the form of intervals [4] and then estimate the initial conditions of a dynamic system to prevent a future undesirable outcome.

References

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