

GUARANTEED NONLINEAR PARAMETER ESTIMATION VIA INTERVAL ANALYSIS

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Interval analysis makes it possible to achieve tasks that are out of the reach of more conventional numerical methods, such as locating *all* global optimizers of possibly multimodal criteria or finding *guaranteed* inner and outer approximations of sets defined by nonlinear inequalities. This is particularly important for the estimation of the parameters of knowledge-based models, when a good data fit is simply not enough and one wants to get all the values of the parameter vector that are optimal (or acceptable). Maximum-likelihood and bounded-error estimation will both be considered, for models defined by linear and nonlinear ODEs. It will be seen that identifiability studies can be bypassed, and that models for which no analytical solution is available can nevertheless be considered. Some limitations and challenges will also be mentioned.