

## **Nonlinear system identification, on algorithms finding initial parameter values for the iterative minimization of the cost function.**

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Computing the parameter estimate in a Maximum Likelihood system identification problem typically leads to an iterative minimization of the negative log-likelihood function. Only for models which are linear in the parameters one can be sure of avoiding local minima. A good start value for the iterative minimization decreases the risk of being trapped in a local minima. This talk starts with a tutorial part explaining the described problem in some detail. Examples are given on earlier work on algorithms for obtaining initial estimates for linear models such as ARMAX and state space models. We then turn to nonlinear system identification. Initialization of nonlinear black-box models using incremental models is explained and motivated. Algorithms for the traditional nonlinear structures Hammerstein and Wiener models are covered and a new algorithm for initializing Wiener-Hammerstein models is presented. This new algorithm is used on the benchmark data from SYSID 2009 and the result is analyzed and explained.