

## Parameter Estimation via Metamodeling

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**Abstract :** Based on appropriate multivariate statistical methodology, we suggest a generic framework for efficient parameter estimation for ordinary differential equations and the corresponding nonlinear models. In this framework classical linear regression strategies is refined into a nonlinear regression by a locally linear modelling technique (known as metamodeling). The approach identifies those latent variables of the given model that accumulate most information about it among all approximations of the same dimension. The method is applied to several benchmark problems, in particular, to the so-called "power-law systems", being non-linear differential equations typically used in Biochemical System Theory.

**Keywords :** principal component analysis, generalized law of mass action, parameter estimation, metamodels

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