

Design of Physical Systems Experiments Using History Matching Methodology

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History matching is a method of efficiently identifying the subset of the input parameter space of a model giving rise to acceptable matches to observed data, given our state of uncertainty about the model and the measurements. We achieve this by iteratively removing parts of the space classed as implausible with the aid of a series of increasingly accurate Bayes linear emulators. Analysis of the resulting subset is informative for answering specific scientific questions about the physical system corresponding to various relevant features of the model. I will introduce history matching, and how we have developed a powerful technique for the design of future system experiments based on history matching criteria relating to current scientific research aims. We will demonstrate our novel methodology to a systems biology setting to analyse hormonal crosstalk in the roots of *Arabidopsis Thaliana*.