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# Estimation of

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Robust procedures for physical parameter estimation

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Bayesian model calibration has become a powerful tool for the analysis of experimental data coupled with a physics-based mathematical model. The forward problem of prediction, especially within the range of data, is generally well-posed. There are many well-known issues with the approach when solving the inverse problem of parameter estimation, especially when the calibration parameters have physical interpretations. In this poster, we explore several techniques to identify and overcome these challenges. First, we consider regularization, which refers to the process of constraining the solution space in a meaningful and reasonable way. This is accomplished via the Moment Penalization prior distribution and the associated probability of prior coherency. Secondly, we consider a pseudo-Bayesian approach which we refer to as modularization. By focusing on a small number of parameters which are considered "of-interest" and forfeiting the ability to learn about the remaining parameters, robust inferential procedures can sometimes be obtained. These ideas are illustrated using several simple examples and a dynamic material property application where material properties of Tantalum are estimated.