

A Bayesian approach for inclusion detection using parametrisations

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Abstract

In this talk, we consider a Bayesian approach of recovering inclusions in PDE-based inverse problems using parameterisations. Examples include the level-set parametrisation which constructs a piecewise constant function from the level sets of a smooth function. We will consider this approach from the perspective of Bayesian consistency. This framework ultimately gives conditions for the parametrisation, forward map and prior such that the posterior mean converges to the ground truth in probability when noise on the data goes to zero. We then test the level-set method for two non-linear and mildly ill-posed PDE-based inverse problems that mimic a setting where these conditions are satisfied.