Computational Methods for Estimation in the Presence of Uncertainty

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ABSTRACT:
In numerous applications in the biological and engineering sciences, one encounters inverse problems where the uncertainty and/or variability in parameters and mechanisms to be modeled are a fundamental part of the problem formulation.
This is in addition to the data-driven uncertainty that arises naturally in most inverse problems.
We discuss several classes of modeling formulations and associated computational methodologies in the context of examples arising in materials and biological processes drawn from the Industrial Applied Mathematics Program at N.C.State University.
Both theoretical and computational findings will be presented.