
XUYUAN WANG, University of Alberta

Detecting and Mitigating Non-Identifiability in Infectious Disease Modeling

Non-identifiability is a common issue in infectious disease modeling, complicating the parameter estimation process when certain model parameters cannot be uniquely determined. This problem arises when multiple parameter sets provide equally good fits to the available data yet yield inconsistent predictions, thereby undermining the predictive reliability of mathematical models. In this talk, I will present an efficient method for detecting non-identifiable parameters using Singular Value Decomposition and Variance Decomposition (SVD-VD) techniques, along with a statistical approach based on regularized regression to mitigate the effects of non-identifiability. It can be demonstrated that the regularized estimator ensures local uniqueness, leading to more stable and reliable predictions. Numerical examples will be provided to illustrate the effectiveness of the SVD-VD method in conjunction with the regularized estimator.