ESTIMATION OF A SIMPLE TRANSPORT MODEL FROM MOMENTS MEASUREMENTS

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Abstract

In this presentation, we will consider a transport model used to describe the protein aggregation, a chain reaction which is one of the causes of neurodegenerative diseases called amyloid diseases (among which are Alzheimer’s, Huntington’s, Parkinson’s etc). Considering a simplified Lifshitz-Slyozov equation, we define a model for protein polymerisation. We assume to observe some moments of the cluster concentrations. Our objective is to solve the inverse problem of estimating the kinetic coefficients and/or initial cluster concentrations. In this respect, we will introduce and compare two alternative strategies to estimate the parameters or the state variable. The first strategy consists in a kernel method, while the second is a data assimilation method. We present some numerical illustrations on synthetic data. Furthermore, we show how these methods, applied on real data, provide biologists interesting insights into the model capabilities and into its inputs properties.