On Inverse Problems for Several Coupled Pde Systems Arising in Mathematical Biology

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In this talk, we discuss several inverse problems of identifying unknown coefficients for a class of coupled PDE systems by measuring the average flux data on part of the underlying boundary. In these coupled systems, we mainly consider the non-negative solutions of the coupled equations, which are consistent with realistic settings in biology and ecology. We develop a new and effective scheme to tackle the inverse problems and achieve unique identifiability results by properly controlling the injection of different source terms to obtain multiple sets of mean flux data. The approach relies on certain monotonicity properties which are related to the intrinsic structures of the coupled PDE system. We also connect our study to biological applications of practical interest.