

A System Identification Approach for Modeling Host-Pathogen Interaction

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In this talk, I will present a black-box approach for modeling host-pathogen interaction based on temporal experimental data. The approach is general and can utilize simultaneously data at hierarchy of levels including, genomic, proteomic, cellular and physiological levels. Both linear and quadratic models will be discussed, The question of designing an intervention is formulated as a control problem and is solved numerically. The goal is to suggest drug mixtures for achieving 'good' immune response. Application of the approach to Influenza A infection in adult and elderly mice will be shown, where both vaccinated and unvaccinated animals will be analyzed. Elderly mice show a slow and inefficient immune response compared with the adult mice. To remedy this potential drug mixtures in conjunction with vaccination are proposed.