Stability of Solutions of Semidiscrete Stochastic Systems

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Abstract : Semidiscrete systems contain both continuous and discrete components. This means that the dynamics is mostly continuous, but at certain instants, it is exposed to abrupt influences. Such systems naturally appear in applications, for example, in biological and ecological models as well as in the control theory. Therefore, the study of semidiscrete systems has recently attracted the attention of many specialists. Stochastic effects are an important part of any realistic approach to modeling. For example, stochasticity arises in the population dynamics, demographic and ecological due to a change in time of factors external to the system affecting the survival of the population. In control theory, random coefficients can simulate inaccuracies in measurements. It will be shown in the presentation how to incorporate such effects into semidiscrete systems. Stability analysis is an essential part of modeling real-world problems. In the presentation, it will be explained how sufficient conditions for the moment stability of solutions in terms of the coefficients for linear semidiscrete stochastic equations can be derived using non-Lyapunov technique.
Keywords : abrupt changes, exponential stability, regularization, stochastic noises

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