



CSC Seminar

SPEAKER

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TITLE

Study of Dynamic Equations on Time Scales

ABSTRACT

In this seminar, we discuss the basics of time scales theory and the dynamic equations on time scales. More precisely, firstly we discuss some basic operators which are very important to study time scales calculus. We discuss the Hilger derivative or delta derivative followed by the delta integral. After that, we discuss the initial value problem on time scales and the variation of parameter formula. Furthermore, we also discuss the following research problems:

1. Finite-Time Stability and Stabilization Results for Switched Impulsive Dynamical Systems on Time Scales:

Here, we study the finite-time stability (FTS) and finite time stabilization problems for a class of switched impulsive systems evolving on an arbitrary time domain. This problem is formulated using time scale theory where the time domain can be continuous, discrete, union of disjoint intervals with variable gaps and variable lengths or any combination of these. Using common Lyapunov-quadratic and Lyapunov-like functions, we establish sufficient conditions to ensure the FTS results. Further, to solve the stabilization problem, we design state feedback controllers. We have illustrated the effectiveness of the obtained analytical results through numerical examples.

2. Results on abstract integro hybrid evolution system with impulses on time scales:

Here, we study the existence of solution, stability analysis and exact controllability results for an abstract integro hybrid evolution system with impulses on time scales. The basic technique of our approach is to reduce the controllability problem into a solvability problem of an operator equation in some suitable function space and then we prove the solvability results for the operator equations which in turn imply the controllability of the system. Non-linear functional analysis, evolution operator theory and Banach contraction theorem have been used to establish these results. In the end, we present some theoretical and numerical examples for different time scales to illustrate the application of these analytical results.

Tuesday, May 11, 2021 at 2 pm

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