National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Control Theory on Superspace and Lie Supergroup
Speaker	: Aroonima Sahoo (Rollno : 519ma2007)
Supervisor	: Kishor Chandra Pati
Venue	: Seminar Room, Department of Mathematics
Date and Time	: 14 May 2025 (11.00 AM)

Abstract : The aim is to unite two independent fields together such as control theory and supermanifold theory. Control theory is a popular interdisciplinary area in science and engineering, which manipulates the system&rsquos input to get some desired output. On the other hand, with the rising importance of supersymmetry in physics, the supermanifold theory is essential in understanding the unified field theory. Due to the formalism of dynamical systems involving both bosonic and fermionic variables such as supersymmetric Schrödinger equations, quantum Kepler problems, quantum (an-)harmonic oscillators, sKdV equation etc., one stands at the edge of introducing the control problems for such dynamical systems in superspace. With this motivation the controllability property of a linear control system is studied in both the cases, when the state-space is taken as a superspace as well as a Lie supergroup. Similarly, a left-invariant control system is also taken on the Lie supergroup and its controllability property is studied using the graded differential geometry concepts such as supermanifold, Lie superalgebra, super vector fields etc. The proposed rank conditions for establishing controllability are also verified in each cases with suitable examples.