UNIVERSITY OF CALIFORNIA
MERCED | School of Natural Sciences

APPLIED MATHEMATICS SEMINAR 291

Invariant, Partially Invariant, and Semi-Invariant Solutions of Nonlinear PDE's and Surfactant-Driven flows

Date: **11/22/2019**
Time: **3:00 PM**
Location: **COB1 265**

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Abstract

In the first part of the talk we review the main concepts of Lie theory of invariance (symmetry) groups of differential equations. We will discuss the approaches to find reduced differential systems and their analytical solutions, particularly, classical invariant solutions, as well as partially invariant, and semi-invariant solutions. In the second part of the talk we will show an application of these ideas for finding analytical solutions of a nonlinear system of PDE's for surfactant-driven flows (Jensen's equations). Surfactant-driven flows are caused by the spreading of a localized surfactant monolayer on a thin viscous film. We study classical Lie symmetries of this system, and discuss the classes of its invariant and partially invariant solutions, and their physical interpretation.

About the Speaker

EDUCATION:

PH.D in Physics & Mathematics: Leningrad Nuclear Physics Institute Russian Academy of Sciences, and Institute of Physics, Estonian Academy of Sciences

MS/BS in Physics & Mathematics: Tartu State University, Tartu, Estonia

Professional Experience:

Professor of Mathematics (CSU Chico)

Associate Professor of Mathematics & Physics, Tennessee State University, Nashville, TN

Associate Professor of Mathematics & Physics, Shaw University, Raleigh, NC

Senior Research Scientist, Theoretical Physics Lab, Institute if Physics, Estonian Academy of Sciences, Tartu, Estonia

SPECIAL INTERESTS: Nonlinear partial differential equations, Lie groups, variational problems, nonlinear wave equations, applications, fluid dynamics, gauge theory, nonlinear models, symmetry properties, solutions, conservation laws, geometrical characteristics.