Wednesday Sep 17, 2014

Speaker: Alexey Shevyakov, Mathematics and Statistics, U of S
Place: MCLN 242.1
Time: 3:30 - 4:30 pm
Title: Constitutive Relations, Natural States, and Travelling Waves in Two-Dimensional Nonlinear Elastodynamics

Abstract: We consider the Lagrangian formulation of the nonlinear equations governing the dynamics of isotropic homogeneous hyperelastic materials. For two-dimensional planar motions of Ciarlet-Mooney-Rivlin solids, we compute equivalence transformations that lead to a reduction of the number parameters in the constitutive law. Further, we classify point symmetries in a general dynamical setting and in traveling wave coordinates. A special value of traveling wave speed is found for which the nonlinear Ciarlet-Mooney-Rivlin equations admit an additional infinite set of point symmetries. A family of exact two-dimensional traveling wave solutions is derived for that case.