

MATHEMATICS DEPARTMENT
North Carolina State University

DIFFERENTIAL EQUATIONS SEMINAR

Wednesday, November 12, 2003
2:35 p.m. 330 Harrelson Hall

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and
Universitat Politecnica de Catalunya

**“Nonholonomic LR systems
as generalized Chaplygin systems
with an invariant measure”**

We consider a class of dynamical systems on a compact Lie group G with a left-invariant metric and right-invariant nonholonomic constraints (so-called LR systems) and show that, under a generic condition on the constraints, such systems can be regarded as generalized Chaplygin systems, which always possess an invariant measure. We study the case $G = SO(n)$, when LR systems are multidimensional generalizations of the Veselova problem of a nonholonomic rigid body motion. For a special choice of the left-invariant metric on $SO(n)$, we prove that under a change of time, the system becomes an integrable Hamiltonian system describing a geodesic flow on the unit sphere S^n . This provides a first example of a nonholonomic system with more than two degrees of freedom for which the celebrated Chaplygin reducibility theorem is applicable.

Graduate students are invited to attend.