1044-49-216 **Jared M Maruskin*** (maruskin@math.sjsu.edu), One Washington Square, Dept. of Mathematics, San Jose, CA 95192-0103, and **Anthony M. Bloch** (abloch@umich.edu), 2074 East Hall, 530 Church St., Ann Arbor, MI 48109-1043. *The Boltzmann-Hamel Equations for the Optimal Control of Mechanical Systems with Nonholonomic Constraints.*

In this talk we generalize the Boltzmann-Hamel equations for nonholonomic mechanics to a form suited for the kinematic or dynamic optimal control of mechanical systems subject to nonholonomic constraints. These equations are also an extension of the Euler-Poincaré optimal control equations to systems whose Lagrangian is not left-invariant or to systems without symmetry. (Received September 02, 2008)