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Mark Colarusso* (mark.colarusso.1@ulaval.ca), Pavillon Alexandre-Vachon, 1045 Av. de la Medecine, Quebec, QC G1V 0A6, Canada, and **Sam Evens** (sevens@nd.edu), 255 Hurley Hall, University of Notre Dame, Notre Dame, IN 46556-4618. *A nonlinear Gelfand-Zeitlin integrable system on the Poisson dual Lie group $GL(n, \mathbb{C})^*$.*

In 2006, Kostant and Wallach constructed an integrable system on the $n \times n$ complex matrices $\mathfrak{gl}(n, \mathbb{C})$ using a classical analogue of the Gelfand-Zeitlin subalgebra of the universal enveloping algebra. This integrable system can be viewed as a complexified version of the one studied by Guillemin and Sternberg on the $n \times n$ Hermitian matrices.

In this talk, we will discuss joint work with Sam Evens in which we construct a nonlinear version of Kostant and Wallach's Gelfand-Zeitlin system for the Poisson dual Lie group $GL(n, \mathbb{C})^*$. We show that the corresponding Hamiltonian vector fields are complete and integrate to a holomorphic action of $\mathbb{C}^{\frac{n(n-1)}{2}}$ on $GL(n, \mathbb{C})^*$. Orbits of $\mathbb{C}^{\frac{n(n-1)}{2}}$ of dimension $\frac{n(n-1)}{2}$ form Lagrangian submanifolds of generic symplectic leaves of $GL(n, \mathbb{C})^*$. We will also discuss ongoing work in studying the geometry of this group action and the algebraic integrability of the nonlinear Gelfand-Zeitlin system. (Received September 21, 2010)