

STEPHEN ANCO, Brock University, St. Catharines, ON

Bi-Hamiltonian operators in Lie group geometry and wave maps

In this talk I will show that the recent geometric derivation of bi-Hamiltonian operators for arclength-preserving flows of curves on constant curvature Riemannian manifolds (due to Sanders and Wang, and Mari Beffa) extends to semisimple Lie group manifolds. In particular the bi-Hamiltonian operators are found to be directly encoded in the Cartan structure equations of a left-invariant moving frame associated with a curve and its flow. These operators lead to a hierarchy of commuting flows and conservation laws generated by a recursion operator which has the form of a “square-root” of the corresponding operator known for constant curvature Riemannian manifolds. As one main result, the -1 flow in this hierarchy is shown to be a wave map equation (*i.e.*, nonlinear sigma model) with the Lie group as the target space.