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David A Long* (dalong@ncsu.edu), **Anthony M Bloch**, **Jerrold E Marsden** and **Dmitry V Zenkov**. *Relaxed Matching for Stabilization of Lagrangian Systems*.

The method of controlled Lagrangians is a technique for stabilizing relative equilibria of mechanical systems with symmetry. The key idea of the method is to modify the kinetic and potential energies of the original system and to view the new terms in the equations of motion introduced by this modification as the control inputs. In this talk we discuss a modification to this technique that gives greater flexibility to the theory, making it applicable to a broader class of systems. This "relaxed matching" technique is demonstrated with the problem of the pendulum on a rotor arm. (Received February 09, 2009)