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**David A Long\*** (dalong@ncsu.edu), **Anthony M Bloch**, **Jerrold E Marsden** and **Dmitry V Zenkov**. *Relaxed Matching for the Method of Controlled Lagrangians*.

The method of controlled Lagrangians is a technique for stabilizing relative equilibria of mechanical systems with symmetry. The idea is to modify the kinetic energy in such a way that the new terms in the equations of motion introduced by this modification can be viewed as the control inputs in the original system. We show that the hypotheses required by this method can be relaxed, making it applicable to a broader class of systems. We demonstrate this new method, called "relaxed matching," with the problem of the pendulum on a rotor arm. (Received September 21, 2009)