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**Emese A. Kennedy\*** (ealipcse@ncsu.edu) and **Hien T. Tran.** *Real-Time Implementation of Nonlinear Control Methodologies for a Single Inverted Pendulum.*

The single inverted pendulum (SIP) system is a classic example of a nonlinear system. It is considered as one of the most popular benchmarks of nonlinear control theory. Many nonlinear methods have been proposed for the swing-up and stabilization of a self-erecting inverted pendulum, however, most of these techniques are too complex and impractical for real-time implementation. We will discuss the real-time implementation of two feedback control methodologies for the nonlinear SIP system. Both techniques are based on a numerical approximation to the solution of the Hamilton-Jacobi-Bellman (HJB) equation. The first method uses power series to approximate the solution to the HJB equation, while the second method applies the power series expansion to the related state-dependent Riccati equation (SDRE) instead of solving the HJB equation itself. (Received September 03, 2014)