Abstract

The inverted pendulum is a highly nonlinear and open loop unstable system. To develop an accurate model of the inverted pendulum, different linear and nonlinear methods of identification will be used. However one of the problems encountered during modeling is the collection of experimental data from the inverted pendulum system. Since the output data from the unstable system does not show enough information or dynamics of the system. This can be overcome by designing a feedback controller, which stabilize the system before identification can take place. Recently Takagi-Sugeno (T-S) fuzzy modeling based on clustering techniques have shown great progress in identification of nonlinear systems. Hence in this paper, Takagi-Sugeno (T-S) model is proposed for an inverted pendulum based on fuzzy c-means, Gustafson-Kessel (G-K) and Gath-Geva (G-G) clustering techniques. Simulation results show that Gustafson-Kessel (G-K) clustering technique produces satisfactory performance.
Reference


Index Terms

Computer Science Fuzzy Systems

Key words

Nonlinear Clustering Fuzzy Inverted Pendulum
Takagi-Sugeno