Farhad Ghorbani

Research Interest:

- Nonlinear Dynamic and Chaos
- System Identification
- Fault Detection and Identification
- Intelligent Control

Thesis Title:

Fault Tolerant Control (FTC) based on Chaotic Anti-Control for a Rotary Inverted Pendulum

Abstract:

Inverted Pendulum (IP) represent a significant class of nonlinear under-actuated mechanical systems, well-suited for the verification and practice of ideas emerging in control theory and robotics. Stabilization of a pendulum rod in the unstable upright position is considered a benchmark control problem which has been solved by attaching the pendulum to a base that either moves in a controlled linear manner (*classical IP*) or in a rotary manner in a horizontal plane (*rotary IP*). Under-actuated mechanical systems are systems that have fewer control inputs than configuration variables. Under-actuated systems appear in a broad range of applications including Robotics, Aerospace Systems, Marine Systems, Flexible Systems, Mobile Systems, and Locomotive Systems.

The natural and attractive properties of chaotic system such as sensitivity to initial condition, pseudo-random behaviour, long-term oscillatory response that not periodic, local instability and total stability can be useful for dynamic system. These properties are widely used in secure communications, mechanics engineer, aerospace engineer, biology …

The purpose of this thesis is that to improve fault tolerant using by Chaotic Synchronization. Create chaotic behaviour for the under control system using by chaotic gyroscope system.

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