



Development of a Neural Network Based System Identification Algorithm for Rotorcraft Applications

Project Outline

System identification uses measured system data to develop mathematical models that accurately represent system behavior. For flight systems, these models not only capture aircraft response characteristics but also provide a foundation for designing and validating advanced flight control systems. While well established time and frequency domain algorithms have been successfully applied to fixed wing aircraft, helicopter identification has largely relied on frequency domain methods due to the highly nonlinear and coupled dynamics of helicopters.

Goal: Investigate neural network based identification algorithms for time domain identification of helicopter dynamics

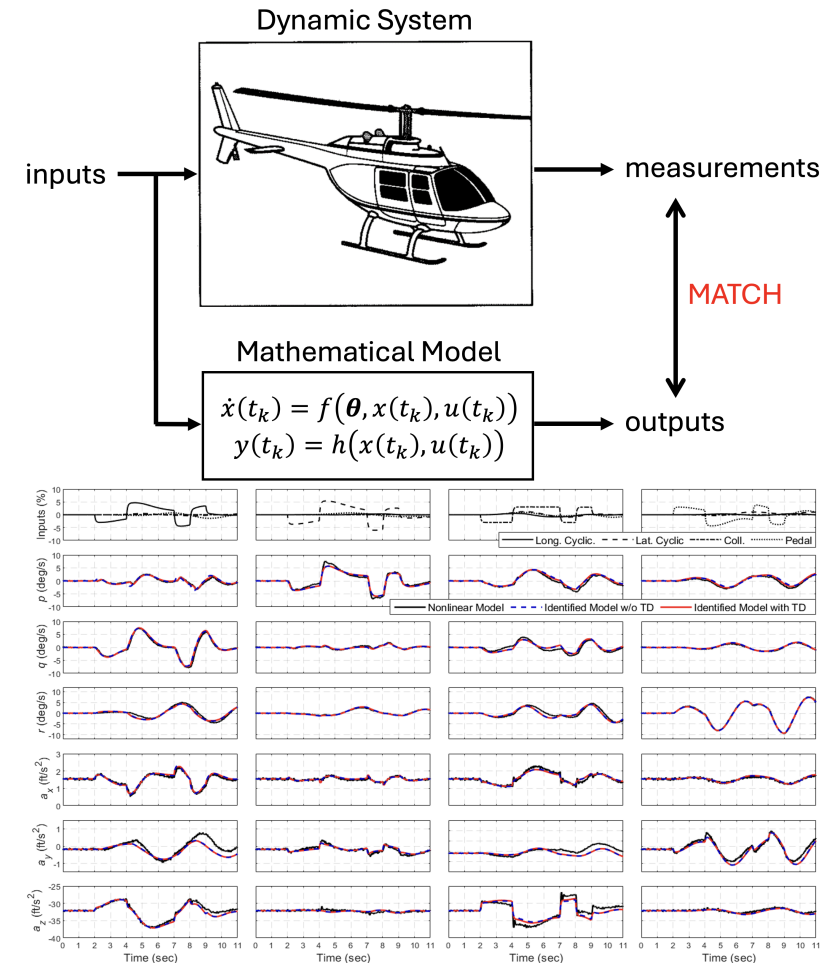
Start: As soon as possible

Project Plan and Milestones

- Literature review on neural networks and possible algorithms.
- MS1:** Selection of the neural network based optimization algorithm.
- Implementation of the selected algorithm in MATLAB
- MS2:** Identification of a simple spring-mass-damper system.
- Extending the framework to identify a nonlinear helicopter model
- MS3:** Demonstration of the algorithm on helicopter identification and validation in frequency domain
- MS4:** Comparison of the results with gradient descend based algorithms.

Prerequisites

- Knowledge on neural networks
- Understanding of helicopter flight mechanics
- MATLAB



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