2 Degree of Freedom Helicopter System

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Abstract

The objective of this project was to construct a Two Degree of Freedom Laboratory Helicopter System that can communicate to MATLAB/Simulink. It serves as an enhancement to the learning environment and would aid in the teaching of both aerodynamics and control systems. In addition, our system must be cost efficient and student friendly.

Introduction

The Laboratory Helicopter System will be able to move and collect data in the pitch and yaw rotations. As the helicopter rotates, the user will be able to use a control system through Simulink in order to not only gather data, but also to send data back to the system thus creating a tool to learn control systems in a safe and effective manner.

Methods and Material

Using four encoders placed on the Laboratory Helicopter System, the pitch, yaw, and motor speed data can be retrieved. The user is able to retrieve this data through the Simulink interface and communicate back commands to the system in order to achieve the desired results.

Results

The systems mechanical design was developed in a CAD model. The system was also able to send and receive data through the Simulink and MATLAB interface.

Discussion

The Two Degree of Freedom Helicopter system can easily be constructed from the layout provided. Students and educational facilities can reproduce this project with ease and even alter the device to better suit their requirements. Furthermore, this device is cost effective when considering alternatives on the market.

Conclusions

Similar products on the market can be very expensive and may not always be available to students or researchers in need. Our system however is very cost efficient and easily maintained allowing for a better overall learning environment for control systems and aerodynamics.

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