

Project #3

Title: Aircraft Landing Gear Performance: Physics-based modelling of hydraulic components

Objectives: To support the development of physics-based models of hydraulic components commonly used in landing gear hydraulic systems: 1. develop libraries of physics-based models for hydraulic components commonly used in landing gear hydraulic systems 2. investigate /develop a standard work for cosimulation of physics-based hydraulic model and ADAMS kinematic model of a landing gear
Description: In support of objective 1, develop libraries of physics-based models for hydraulic components commonly used in landing gear hydraulic systems: - The student will first investigate and identify the most suitable physics-based modelling software package. The list of available software are: MATLAB/Simulink with Simhydraulics Add-on, MSC EASY5, AMESim (TBD) - The student's goal will be the creation and testing of physics-based models of various hydraulic components and systems, employing knowledge in fluid dynamic equations, to be used in a co-simulation with ADAMS dynamic models. In support of objective 2, investigate /develop a standard work for co-simulation of physics-based hydraulic model and ADAMS kinematic model of a landing gear: - The student will develop and investigate a method to co-simulate landing gear hydraulic actuation system using the library of physics-based models of hydraulic components, developed per Objective 1, with landing gear ADAMS dynamic models. The actuator model using the physics-based hydraulic models will be tested against existing models, using theoretical and test data, for validation and verification. - The student will be consolidating and version-controlling the library of physics-based hydraulic component models in the physics-based modelling software package selected in objective 1. - Training presentation: the student will develop training materials on the use of the physics-based model library and the co-simulation of the generated models with ADAMS dynamic models of landing gear. Progress meetings and support: The projects will be supported by the Collins Performance Engineering staff. Regular meetings will take place with staff members to discuss status and remaining tasks.

Prerequisite and Skill Required: Technical skills: - Dynamics and hydraulics - Systems modeling - Proficiency in MATLAB/Simulink Simhydraulics Add-on is a plus - Proficiency in MSC EASY5 Suite is a plus - Proficiency in AMESim is a plus
Interpersonal skills: - Good communications skills - Independent worker

Eligibility

- In good academic standing
- Enrolled in MIE MEng program
- M. Eng. majored in Mechanical or Industrial Engineering
- Strong English communication skills, oral and written
- Students must maintain their student status throughout the project
- Students must be Canadian citizen or Permanent Resident

Start Date and duration of the project: May 2021 (~4 months)

Application Instructions: Please combine (1) application form, cover letter and resume and unofficial transcripts (undergrad and grad) as one PDF file and email it to: imdi@mie.utoronto.ca.

Please name your file as: Collins-first name initial,last name, project number e.g. Collins -J.Smith, #1).

Application Deadline: *Applications to be submitted to imdi@mie.utoronto.ca by Wed Jan 13 @ 5PM.*

Questions to be directed to the UT-IMDI Office imdi@mie.utoronto.ca