Presentation of the tutorials

Two tutorials are proposed on June 1, 2018. The tutorials will be held at INSA Toulouse, 135 Avenue de Rangueil, 31077 Toulouse Cedex 4, France.

The number of places is limited to the first 20 registrations.

The registration fee for one tutorial is 100 €. It includes the coffee breaks and the printed copy of the tutorial slides. Each tutorial will start at 2 pm am and finish at 5.30 pm.

Tutorial 1. Introduction to optimization of actuation systems with open-source tools, by Associate Professor Marc BUDINGER

Abstract: The tutorial concerns the use of open-source tools such as python, python scientific libraries, python notebooks and openModelica in order to realize the preliminary design of electromechanical actuators in the field of aeronautics. The tutorial will show how: to represent datasheet catalogs, FEM simulation using scaling laws or surrogate models, to model transient mission with openModelica or state-space models, to associate models in order to size and optimize the overall system with easy to use python packages. There are no specific requirements in simulation with Modelica or python programming for understanding and achieving the tutorial.

Tutor: Marc Budinger is associate professor at INSA and researcher at Institut Clément Ader in Toulouse. He got in 1998 the Aggregation degree in Applied Physics, in 2003 the Ph.D degrees in Electrical Engineering from Institut National Polytechnique de Toulouse and in 2014 the HdR in Mechanical Engineering from Toulouse University. His research activities have included design of electrical submarine propulsion motor, piezoelectric actuators and MEMS. His current research topic deals with the preliminary design of aerospace electromechanical actuators.

Tutorial 2. Virtual prototyping of mechanical transmission of aerospace actuators, by Professor Jean-Charles MARÉ

Abstract: The tutorial aims at making the delegates more familiar with the behaviour and system level modelling and simulation of mechanical transmissions of aerospace actuators. Special attention will be paid to energy losses, inertia, parasitic compliance, preloading and backlash that are present in the power path. Power management devices like clutch, brake, torque limiter, soft endstop, position or torque summing will be addressed too. Basic effects then full electromechanical actuator will be addressed to run (virtual) tests that will illustrate the impact of the considered effects on actuator performance and the importance of their simulation. The tutorial is not software oriented. For this reason, there is no special requirement for a prior experience in simulation. The proposed practices and modelling approaches can be easily re-used within any simulation environment.

Tutor: Pr Jean-Charles MARE is professor at INSA and researcher at Institut Clément Ader in Toulouse. In 1993, he got the French Doctorat d'Etat dealing with the modelling, the simulation, the identification and the control of electrohydraulic actuators. Pr MARE has acquired more than 30 years of experience in system level simulation of aerospace actuators and actuation systems. He has been involved in industrial and research projects for commercial aircrafts, helicopters, weapons and test benches. His field of expertise for the system level modelling and virtual prototyping concerns essentially the hydraulic and mechanical power transmission and control. He is the author of a recently published series of 3 books titled Aerospace Actuators (ISTE/Wiley editors).

More information on the tutors' current research activities can be found at the Institut Clement Ader website: www.institut-clement-ader.fr.