

# Chapter 6

## Conclusion



This brief highlights the importance and the necessity of carrying out system identification in the context of electro-hydraulic actuation system for flight control applications. The advantages of system identification in building real-time plant models of the physical systems and its subsequent application in dynamic simulations and virtual prototyping have been highlighted. A servo valve model has been built using test results and the system identification toolbox in Matlab. A physical setup consisting of flapper nozzle type servo valve and a double acting actuator connected to loading system has been used for this purpose. The servo valve model is useful in the flight control design optimization and can result in reduced design cycle time and reduced procurement costs. The servo valve model built from system identification and the analytical white box model are simulated in Matlab and the results are compared with experimental data.

From the results, the mathematical model obtained from the grey-box model gives the best fit of 95.4% for the 0.5–2 Hz chirp signal. The second-order transfer function model (2 poles and 0 zero) obtained through this method is used for the further identification of system parameters such as servo valve gain and natural frequency. The simulation model and the test data from the test rig show that the accuracy of the model identified with the help of measured data is satisfying. Finally, the tests carried out to compare the performance plot from supplier also have a satisfying match between the measured data and the supplier plot. Therefore, it is concluded that system identification can be a very handy tool when it is intended to build a mathematical model of dynamic systems like that of hydraulic systems.