

# Comparison between a Non-Linear and Linear Mathematical Model for an Electro-Hydraulic Servo-Actuator

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*Abstract* — This paper presents a comparison between the numerical simulations performed for an electro-hydraulic servo-actuator using two different mathematical models. One follows to show the differences between the results obtained in the two cases, in order to choose the appropriate model if it is necessary to simulate larger systems which contains such servo-actuators. The first of the mathematical models uses mass flow ratios and the second is a linearized volume flow ratio model. One observed in the mechanic-hydraulic servo-actuators case the linearised models with volume flow ratios can easy attempt auto-oscillations regimes or can lead to result that are not in concordance with the experimental results. The mathematical models with mass flow ratios obtained more stable results than the volume flow ratios ones. But the advantage of the linearised volume flow ratio models is their simplicity, and they are easier to be studied and simulated by numerical methods. One follows to see if auto-oscillations appear for the electro-hydraulic servo-actuators. Also, one follows to compare the results from the servo-actuator behavior point of view – response time and stationary error. Using one or the other model may be profitable in different stages of servo-actuator study such as design or functioning verification of an already designed servo-actuator.