



IDENTIFICATION OF ELECTRO-HYDRAULIC ACTUATOR USING FRACTIONAL MODEL

¹Nuzaihan Mhd Yusof, ²Norlela Ishak, ²Ramli Adnan, ³Yahaya Md. Sam, ²Mazidah Tajjudin and
²Mohd Hezri Fazalul Rahiman

¹Faculty of Electrical Engineering,

²Frontier Materials and Industry Application, UiTM-RMI-CoRe FMIA,
University Teknologi MARA (UiTM), 40450 Shah Alam, Selangor, Malaysia

³Department of Control and Instrumentation, Faculty of Electrical Engineering.

Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia

Email: nuzaihanmhd Yusof@gmail.com

Submitted: Oct. 15, 2016

Accepted: Jan. 6, 2016

Published: Mar. 1, 2016

Abstract – Electro-hydraulic actuator (EHA system) identification is to describe the characteristic of the system that useful for prediction or control system design. There are numerous methods of EHA modeling but there has not been much model using fractional-order (FO) model. In this work, integer-order (IO) model and FO model are developed to model EHA system. Output-error method is used as the estimator for both model. The coefficient of IO model was first estimated and using the estimated coefficient, the derivative order of FO model is estimated. These models has been validated by comparison of error, coefficient of determination (R^2), mean square error (MSE) and correlation function. The results for the proposed model show improvement compared to the IO model.

Keyword – system identification; EHA; modeling; fractional-order model; continuous-time transfer function.