



## CONFERENCE PROCEEDINGS

# International Research Conference on Engineering and Applied Sciences 2023

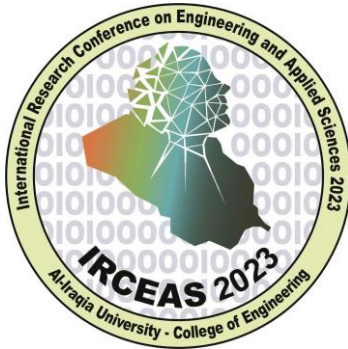
## PROGRAM & ABSTRACTS

# International Research Conference on Engineering and Applied Sciences 2023

Baghdad, Iraq

16<sup>th</sup> - 17<sup>th</sup> October 2023





**IRCEAS2023**  
**International Research Conference on Engineering  
and Applied Sciences 2023**

**16<sup>th</sup>-17<sup>th</sup> October 2023**  
**Baghdad, Iraq**



<b>IRCEAS-370</b>	<b>Merging Control Methods to Evaluate a Two-Link Manipulators Performance with Disturbances</b>
<b>Author(s)</b>	Mohammed H. Al-Mola <sup>1, a)</sup> and Sherif I. Abdelmaksoud <sup>2, b)</sup>
<b>Affiliation(s)</b>	<sup>1</sup> Department of Petroleum and Refining Engineering, College of Petroleum and Mining Engineering, University of Mosul, 41002 Mosul, Nineveh, Iraq. <sup>2</sup> Aerospace Engineering Department, King Fahd University of Petroleum and Minerals, Dhahran 31261, Saudi Arabia.
<b>Email(s)</b>	<sup>a)</sup> Corresponding author: <a href="mailto:dr.mohammedalmola@uomosul.edu.iq">dr.mohammedalmola@uomosul.edu.iq</a> <sup>b)</sup> <a href="mailto:sherifibrahim@kfupm.edu.sa">sherifibrahim@kfupm.edu.sa</a>
<b>Abstract</b>	To incorporate human behavior into robot action, many intelligent control systems have been employed in recent robotics developments. The Takagi-Sugeno (T-S) Fuzzy logic-based PID algorithms are implemented in a two-degree-of-freedom (2DOF) robot manipulator in this study. In order to provide the controller with optimal performance with the existence of disturbances, the FL+PID scheme is simulated and compared. The findings demonstrate that compared to PID controller schemes, the proposed merged controller offers stable performance in both links. Even in the presence of disturbances, the implementation is responding to control stability and provides consistent performance. The results showed that employing (T-S) FLC-based PID compared to a traditional controller significantly increased the system's stability. Moreover, the Integral Square Error (ISE) display improvement for link1 and link2 are 82.83% and 65.57%, and demonstrates superior in favor of the proposed technique even in the presence of disturbances, with 86.2% and 65.36 % for links 1 and 2, respectively.