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# CERTIFICATE OF PARTICIPATION

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S. INTERNATIONAL CONFERENCE ON COMPUTATIONAL METHODS IN

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# Dynamic Modeling and Design of interval type-2 fuzzy sliding-mode controller of an Hexacopter UAV

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**Abstract: The control of the hexarotor helicopter includes nonlinearities, uncertainties and external perturbations that should be considered in the design of control laws. This paper presents a control strategy for an underactuated six degrees of freedom (6 DOF) hexarotor helicopter, based on the coupling of the interval type-2 fuzzy logic (IT2FL) control and sliding mode control (SMC). The main purpose of this work is to eliminate the chattering phenomenon. To achieve our purpose we have used a IT2FL control to generate the hitting control signal, the results of our simulations indicate that the control performance of the hexacopter are satisfactory and the proposed interval type-2 fuzzy sliding mode control (IT2FSMC) can achieve favorable tracking performance.**

**Keywords: Interval Type-2 Fuzzy Sliding Mode Control, Hexarotor Helicopter, Dynamic Modelling, Underactuated Systems**

 **2010 Mathematics Subject Classification: 70E60, 93C85.**

# References

[1] A. Alaimo, V. Artale, C.R Milazzo, A. Ricciardello,"PID Controller Applied to Hexacopter Flight", Journal of Intelligent & Robotic Systems, Vol. 73, pp.261-270, 2014.

[2] Z. Zhang, Z. Liu, N. Wen," Research on Nonlinear H∞/Adaptive Backstepping Control Method for a Hex-Rotor Unmanned Aerial Vehicle, Proceedings, Part I, of the 16th Asia Simulation Conference and SCS Autumn Simulation Multi-Conference, pp 136-145, 2016.

[3] S. Zeghlache, K. Kara, D. Saigaa," Fault Tolerant control based on Interval Type-2 Fuzzy Sliding Mode Controller for Coaxial Trirotor Aircraft", ISA transaction, vol. 59, pp.215-231,2015.

[4] S. Busarakum, V. Srichatrapimuk," The design of sliding mode control of a hexarotor," Proceedings of the IEEE Conference on Systems, Process and Control, pp 47-52, 2014.