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Special Session

HYBRID INTELLIGENT CONTROLS VIA FUZZY BASED SYNERGIES

(Intelligent Control Synergies of Fuzzy, Fuzzy-neural, Fuzzy-Petri and Fuzzy-switched Systems)

Proposed by:

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Outline Synopsis: Synthesis designs of intelligent control and supervision control systems follow the general paradigm of computational intelligence via employing synergy compounds comprising compatible blends of fuzzy logic and neural networks along with math-analytical tools such as Lyapunov stability and/or Kolmogorov functional representation theories. This special session is dedicated to the essential role of fuzzy logic in the respective synergies with other mathematical and system-theoretic tools, due to its unique capacity to emulate human inference and approximate reasoning in decision and control tasks. The obtained simulation results in all synergy cases studied have demonstrated either improved or innovated system performances superior to the previously known ones hence seem a promising research direction for emerging technologies.

Keywords: Applied computational intelligence; approximate reasoning; fuzzy, fuzzy-neural, fuzzy-Petri and fuzzy-switched models; inference; intelligent controls; stabilization designs.

Session Hybrid Intelligent Controls 1

1/. Recent Advances in Analysis and Control Design for Switched Fuzzy Systems: A Review

By Vesna Ojleska, Tatjana Kolemisevska-Gugulovska, and Gyorgyi Dymirkovsky, SS Cyril and Methodius University, Skopje, R. Macedonia

2/. A Two-layer Multiple Lyapunov Function Based Stabilization Control of Switched Fuzzy Systems

By Jinming Luo and Gyorgyi Dymirkovsky, Northeastern University, Shenyang, P.R. China, and Dogus University, Istanbul, R. Turkey and SS Cyril and Methodius University, Skopje, R. Macedonia

3/. A Robust Output Feedback Control Design for Uncertain Switched Fuzzy Systems

By Vesna Ojleska, Tatjana Kolemisevska-Gugulovska, and Imre Rudas, SS Cyril and Methodius University, Skopje, R. Macedonia, Obuda' University, Budapest, Hungary, Northeastern University, Shenyang, P.R. China, and Dogus University, Istanbul, R. Turkey

4/. Pusher Reheating Furnace Control via Fuzzy-Neural Model Predictive Control Synthesis

By Goran Stojanovski, Mile Stankovski, Imre Rudas, and Juanwei Ying, SS Cyril and Methodius University, Skopje, R. Macedonia, Obuda' University, Budapest, R. Hungary, Northeastern University, Shenyang, P.R. China

5/. Intelligent System for Freeway Ramp Metering Control

By Konstandina Veljanovska, Zoran Gacovski, and Stojce Deskovski, St Clement Ohridski University, Faculty of Administration & Information Systems Management and Technical Faculty, Bitola, and FON University, Faculty for Information and Computing Technologies, Skopje, R. Macedonia

Session Hybrid Intelligent Controls 2

6/. An Intelligent Fuzzy-Petri Reasoning Supervisory Control for FMS Manufacturing Plants

By Goran Vladev, Dilek Tukel, and Tatjana Kolemisevska-Gugulovska, SS Cyril and Methodius University, Skopje, R. Macedonia, and Dogus University, Istanbul, R. Turkey

7/. FMS Intelligent Supervision and Control 2: Communications among Machines under FPSC

By Goran Vladev, Vesna Ojleska, Tatjana Kolemisevska-Gugulovska, and Dilek Tukel, SS Cyril and Methodius University, Skopje, R. Macedonia, and Dogus University, Istanbul, R. Turkey

8/. A Robust Quadratic Stabilization Synthesis for Uncertain Systems Based on T-S Fuzzy Model

By Mile Stankovski, Goran Stojanovski, Gorjan Nadzinski, and Zhaona Chen, SS Cyril and Methodius University, Skopje, R. Macedonia, Northeastern University, Shenyang, P.R. China

9/. A Min-Max Control Synthesis for Uncertain Nonlinear Systems Based on T-S Fuzzy Model

By Tatjana Kolemsievska-Gugulovska, Mile Stankovski, Imre Rudas, Nan Jiang, and Juanwei Ying, SS Cyril and Methodius University, Skopje, R. Macedonia, Obuda' University, Budapest, R. Hungary, Northeastern University, Shenyang, P.R. China, and Dogus University, Istanbul, R. Turkey

10/. A Tracking Control Synthesis for Uncertain Delay Nonlinear Systems Based on T-S Fuzzy Model

by Goran Stojanovski, Gorjan Nadzinski, Mile Stankovski, and Xin-Wei Jiang, SS Cyril and Methodius University, Skopje, R. Macedonia, and Northeastern University, Shenyang, P.R. China

11/. A Design of Discrete-time SMC for Nonlinear Systems Based on T-S Fuzzy Model

by Gorjan Nadzinski, Goran Vladev, and Yan Zheng, SS Cyril and Methodius University, Skopje, R. Macedonia, and Northeastern University, Shenyang, P.R. China