

# Proposal for Special Session at IEEE CASE 2021

## Goal:

Since the seminal work of Ramadge and Wonham in 1987, the control of discrete-event systems (DES) has been an active research area in the controls community in the past 35 years. Many systematic methods, tools and algorithms have been developed for DES analysis, control synthesis and verifications. Leveraging the developed tools, many potential applications of DES control have been proposed in the literature; relatively few, however, have been demonstrated on actual hardware in a lab or commercial environment.

The principal objective of this invited session is, therefore, to present the "state of the art" DES control applications. Our aim is to show that DES control methods are not only theoretically sound, but also practically useful. With 5 papers, we demonstrate the impact of DES control on a wide scope of engineering practice, from robotics, to logistics and infrastructure systems.

An additional purpose of this invited session is to promote synergy of DES research and topics related to application and implementation of such systems. This special session aims to provide a forum at CASE 2021, to explore similarities and differences among methods developed in these areas, and to motivate discussions on how to effectively synergize different tools for control design of real complex systems.

Finally it is worth mentioning that the IEEE Technical Committee on DES (where the proposers are chair and co-chair) has planned to organize a series of invited sessions in 2021 that aim at applications of Discrete-Event Systems. We feel that CASE has been one of the prominent venues for the dissemination of high quality discrete-event systems research over the years.

**Session Title:** Applications of Discrete-event Systems

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## **Contributions:**

1. "A Supervisory Controller Configurator for Roadside Systems." by Jeroen Verbakel / Erik Vos de Wael / Asia van de Mortel-Fronczak / Wan Fokkink / Koos Rooda
2. "Synthesis and Implementation of Distributed Supervisory Controllers with Communication Delays" by Lars Moormann / Jaap Schouten / Asia van de Mortel-Fronczak ? Wan Fokkink / Koos Rooda
3. "Distributed Identification of Discrete-Event Systems with the Aim of Fault Detection" by J.G. Villardi de Castro / Gustavo Viana ? M.V. Moreira

4. “On the Application of Supervisory Control Theory for Deadlock Avoidance in AGV systems” by Sarmad Riazi / Evelina Dahlsten / Anton Jansson / Sebastian Svanland / Martin Fabian
5. “Efficiently Enforcing Mutual State Exclusion Requirements in Symbolic Supervisor Synthesis” by Sander Thuijsman / Michel Reniers / Dennis Hendriks