IEEE Control Systems Society
Technical Committee on Discrete Event Systems

Newsletter January 2022

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Welcome to the 2022 January issue of the newsletter, also available online at
http://ieeecss.org/tc/discrete-event-systems/newsletters

Editorial

You are welcome to submit new items to the newsletter (topics including schools, workshops, sessions, conferences, journals, books, software, positions). Also please encourage relevant colleagues and students to subscribe to this newsletter.

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  or email to kai.cai@eng.osaka-cu.ac.jp.
- To **subscribe**, please email to kai.cai@eng.osaka-cu.ac.jp.
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Contents

1 Selections of Journal Publications

Contributed by: Xiang Yin (yinxiang@sjtu.edu.cn)

1.1. IEEE Transactions on Automatic Control

Volume: 67, Issue: 1, January 2022

- **Abstraction of the Supervisory Control Solution to Deal With Planning Problems in Manufacturing Systems**
  Authors: Patrícia N. Pena ; Juliana N. Vilela ; Michel R. C. Alves ; Gustavo C. Rafael
  Abstract: In industry, the performance has to be optimized to allow its competitiveness. The goal then is to use the resources at their maximal capacity, reduce the production time, and be flexible to adapt to the customers requests. The closed-loop behavior of a system under the supervisory control theory (SCT) guarantees nonblockingness and safety requirements and, thus, it can be used as the search universe for a planning problem. SCT suffers with the curse of dimensionality when systems become bigger and more complex. This article presents a set of sufficient conditions that allow to work with abstractions of the closed-loop behavior (supremal controllable sublanguage), instead of the closed-loop behavior itself, as the search universe to solve a planning problem. Such abstraction is the natural projection of the supervisor into the set of controllable events satisfying the observer property. This process leads to a reduction of the search space.

- **Discrete Event Dynamic Modeling and Analysis of the Democratic Progress in a Society Controlled by Networked Agents**
  Authors: Seong-Jin Park ; Kwang-Hyun Cho
  Abstract: This article proposes a formal framework based on discrete event systems in order to analyze the democratic progress and regression in a society controlled by networked agents. For this purpose, we construct a simple model using a finite state automaton that describes the dynamic behavior of progress and regression in a democracy. We represent a network of agents as a directed graph where each agent has its own objective. Each agent may be a citizen or a group of people sharing a common objective, and it makes decisions on enabling or disabling events upon the observation of states of a system. Agents may have different decisions on the same event, and the final decision follows the majority rule. Upon this framework, we derive the necessary and sufficient conditions for a democratic system controlled by networked agents to be progressive or regressive, where a progressive one implies that it reaches a more equal state at which a larger number of agents meet their objectives. Finally, we obtain some convergence results for special graph topologies.

- **Asymptotical Stability and Stabilization of Continuous-Time Probabilistic Logic Networks**
  Authors: Yuqian Guo ; Zhitao Li ; Yang Liu ; Weihua Gui
  Abstract: Discrete-time probabilistic logic networks (DT-PLNs), of which probabilistic Boolean networks (PBNs) are a special type, are an important qualitative model for gene regulatory networks (GRNs). Although a DT-PLN can predict the long-term behavior of a GRN, using it to describe the transient kinetics at the microtimescale level remains inconvenient. In this article, we investigate the problems associated with the stability and stabilization of continuous-time probabilistic logic networks (CT-PLNs). First, we demonstrate that the concept of finite-time stability for DT-PLNs cannot be extended to CT-PLNs owing to the nonsingularity of transitional probability matrices. Thus, we introduce the concept of asymptotical stability, which is defined as the convergence in distribution of the network state. Second, by developing the theory of invariant subsets for CT-PLNs, a necessary and sufficient condition for asymptotical stability with respect to a subset is proposed, which is expressed in terms of the transition rate matrix of probability. Third, for a CT-PLN with input nodes, termed a continuous-time probabilistic logic control network, we discuss the subsets that are invariant under piece-wise constant input. Based thereupon, we propose a necessary and sufficient condition under which asymptotically stabilizing sampled-data feedback exists. A method for designing sampled-data feedback is proposed. Last, Monte Carlo simulation algorithms are proposed to efficiently simulate a CT-PLN in the time domain. Examples are provided to demonstrate the methods proposed in this article.

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1.2. Automatica

Volume: 135, January 2022

- **Synthesis of maximally permissive supervisors for similarity control of partially observed nondeterministic discrete event systems**
  Authors: Jinglun Li ; Shigemasa Takai
  Abstract: This paper handles a supervisory control problem for partially observed discrete event systems, where both the system and the specification are modeled as nondeterministic automata. This problem requires us to synthesize a nondeterministic supervisor, named similarity-enforcing supervisor, such that the supervised system is simulated by the specification. To solve this problem, the existence condition of a similarity-enforcing supervisor under full observation is extended to the case of partial observation. We provide a method to synthesize a similarity-enforcing supervisor when the existence condition holds. In addition, we show that the synthesized supervisor is maximally permissive in a global sense, which is achievable owing to the nondeterminism of the supervisor.
- **Parameter estimation for Jump Markov Linear Systems**
  Authors: Mark P.Balenzuela ; Adrian G.Wills ; Christopher Renton ; Brett Ninness
  Abstract: Jump Markov linear systems (JMLS) are a useful model class for capturing abrupt changes in system behaviour that are temporally random, such as when a fault occurs. In many situations, accurate knowledge of the model is not readily available and can be difficult to obtain based on first principles. This paper presents a method for learning parameter values of this model class based on available inputoutput data using the maximum-likelihood framework. In particular, the expectationmaximisation method is detailed for this model class with attention given to a deterministic and numerically stable implementation. The presented algorithm is compared to state-of-the-art methods on several simulation examples with favourable results.

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1.3. IEEE Control Systems Letter

Volume: 6, Issue: 1, January 2022

- **Point-Based Value Iteration for VAR-POMDPs**
  Authors: Wei Zheng ; Hai Lin
  Abstract: Partially observable Markov decision processes have been widely adopted in the automatic planning literature since it elegantly captures both execution and observation uncertainties. In our previous paper, we proposed a model called vector autoregressive partially observable Markov decision process (VAR-POMDP) which extends the traditional POMDP by considering the temporal correlation among continuous observations. However, it is a non-trivial problem to develop a tractable planning algorithm for the VAR-POMDP model with performance guarantees as most existing algorithms need to explicitly enumerate all possible observation histories, which is in an unbounded continuous space. In this letter, we extend the famous point-based value iteration algorithm to a double point-based value iteration and show that the VAR-POMDP model can be solved by dynamic programming through approximating the exact value function by a class of piece-wise linear functions. Meanwhile, we prove that the approximation error is bounded. The effectiveness of the proposed planning algorithm is illustrated by an example.
- **Assessment of Multilevel Intransitive Non-Interference for Discrete Event Systems**
  Authors: Francesco Basile ; Gianmaria De Tommasi
  Abstract: Privacy of distributed cyber-physical systems can be compromised by the presence of information leaks which permit to external intruders to infer the state of the system itself. These systems are built using several off-the-shelf components with communication capabilities that provide a significant level of control, and lower operational costs in comparison to the traditional vendor-specific proprietary and closed-source systems. However, these components expose the control systems to more vulnerabilities and threats. This work focuses on the multi-level intransitive non-interference, a property particularly suitable to tackle privacy problems of control systems un-

der attack. The property is characterized and verified using Petri net models and mathematical programming.

- **Output Feedback Reachability of Controlled-Observable States for Nondeterministic Finite-State Systems**
  Authors: Tommaso Masciulli ; Giordano Pola ; Elena De Santis ; Maria Domenica Di Benedetto
  Abstract: In this letter control design of nondeterministic finite state systems with reachability specifications is addressed. The class of controllers we use is rather general and combines feedforward and output feedback schemes. The proposed controller allows not only the state of the system to reach the desired target set but also the identification of which state of the target set has been reached. Necessary and sufficient conditions are derived for the control problem to admit a solution and a controller is designed. The solution to the investigated problem has important implications in the context of recovery control and symbolic control design of nonlinear and hybrid systems, as discussed also through some examples.
- **Recurrent Neural Network Controllers for Signal Temporal Logic Specifications Subject to Safety Constraints**
  Authors: Wenliang Liu ; Noushin Mehdipour ; Calin Belta
  Abstract: We propose a framework based on Recurrent Neural Networks (RNNs) to determine an optimal control strategy for a discrete-time system that is required to satisfy specifications given as Signal Temporal Logic (STL) formulae. RNNs can store information of a system over time, thus, enable us to determine satisfaction of the dynamic temporal requirements specified in STL formulae. Given a STL formula, a dataset of satisfying system executions and corresponding control policies, we can use RNNs to predict a control policy at each time based on the current and previous states of system. We use Control Barrier Functions (CBFs) to guarantee the safety of the predicted control policy. We validate our theoretical formulation and demonstrate its performance in an optimal control problem subject to partially unknown safety constraints through simulations.
- **Model Discrimination of Switched Nonlinear Systems With Temporal Logic-Constrained Switching**
  Authors: Ruochen Niu ; Syed M. Hassaan ; Liren Yang ; Zeyuan Jin ; Sze Zheng Yong
  Abstract: This letter considers the model discrimination problem for switched nonlinear systems, where the switching sequence is constrained by metric/signal temporal logic specifications. Specifically, we propose an optimization-based algorithm for analyzing the detectability of the models from noisy, finite data as well as a model discrimination algorithm for nonlinear parameter-varying systems to rule out models that are inconsistent with observations at run time, by checking the feasibility of corresponding mixed-integer linear programs. Moreover, we apply the algorithms to nonlinear systems subject to (m,k)-firm data losses and explicitly provide the integer constraints corresponding to the (m,k)-firm constraints for lossy/missing data. Finally, we demonstrate the effectiveness of our approaches using several illustrative examples on fault detection, swarm consensus and intent identification problems.

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1.4. IEEE Transactions on Control Systems Technology

Volume: 30, Issue: 1, January 2022

- **Model Predictive Control of Priced Timed Automata Encoded With First-Order Logic**
  Authors: Efe C. Balta ; Ilya Kovalenko ; Isaac A. Spiegel ; Dawn M. Tilbury ; Kira Barton
  Abstract: Priced timed automata (PTA) are discrete-event system models with temporal constraints and a cost function and are used to pose optimal scheduling and routing problems. To date, solutions to these problems have been found offline and executed open loop.This open-loop control strategy makes it impossible to account for disturbances, i.e., changes in costs or scheduling constraints over time. To address this shortcoming, this works first contribution is a closed-loop model predictive control (MPC) framework for PTA, enabling decision-making based on real-time model updates. To ensure the feasibility of an MPC problem, it is often desirable to soften constraints. However, the contemporary PTA theory does not consider soft constraints. Thus, this

works second contribution is to integrate constraint softening with PTA control by harnessing the capabilities of new solvers enabled by the recasting of the models and control problem into first-order logic by employing modified encoding schemes based on existing works. Finally, the proposed control framework and implementation are demonstrated in a simulation case study on the guidance of a product through a manufacturing system.

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1.5. IEEE Transactions on Systems, Man, and Cybernetics: Systems

Volume: 52, Issue: 1, January 2022

- **Discrete Event Approach to Robust Control in Automated Manufacturing Systems**
  Authors: Xiaojun Wang ; Hesuan Hu ; MengChu Zhou
  Abstract: In recent decades, deadlock control for automated manufacturing systems has been an active area. Most researchers have assumed that allocated resources, such as sensors, actuators, and controllers never fail. However, this case is not prevalent in practice due to the unexpected failure of resources. Thus, the objective of robust control is presented in this article. Several methods have been developed along this direction, such as methods that combine neighborhood constraints and the modified Bankers algorithm, as well as methods based on critical places. To explore their effectiveness and performance, we not only conduct a comparison investigation but also develop new theoretical results. According to the experimental results, critical place-based approaches are simpler, more efficient, and more comprehensive than the Bankers algorithm-based approaches in response to resource failures. This article is motivated by the control of production Petri nets; however, the results are also applicable to other more complex systems.

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2 Conferences

Contributed by: Xiang Yin (yinxiang@sjtu.edu.cn)

2.1 **2022 ACM International Conference on Hybrid Systems: Computation and Control (HSCC)**
Milan, Italy, May 4-6, 2022
https://hscc.acm.org/2022/

2.2 **2022 IEEE Conference on Robotics and Automation (ICRA)**
Philadelphia, USA, May 23-27, 2022
https://www.icra2022.org/

2.3 **2022 American Control Conference (ACC)**
Atlanta, Georgia, USA, June 8-10, 2022
https://acc2022.a2c2.org/

2.4 **2022 IEEE Conference on Control Technology and Applications (CCTA)**
Stazione Marittima, Trieste, Italy, August 23-25, 2022
https://acc2022.a2c2.org/

2.5 **2022 IEEE International Conference on Automation Science and Engineering (CASE)**
Mexico City, Mexico, August 20-24, 2022
http://www.case2022.org/

2.6 **2022 International Workshop on Discrete Event Systems (WODES)**
Prague, Czechia, September 7-9, 2022
https://wodes2022.math.cas.cz

2.7 **2022 IEEE International Conference on Systems, Man, and Cybernetics (SMC)**
Prague, Czech Republic, October 9-12, 2022
https://ieeesmc2022.org/

2.8 **2022 IEEE Conference on Decision and Control (CDC)**
Cancun, Mexico, December 6-9, 2022
https://cdc2022.ieeecss.org/

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3 Books

3.1 Analysis and Control for Resilience of Discrete Event Systems

Authors: Joao Carlos Basilio, Christoforos N. Hadjicostis and Rong Su

Description: System resilience captures the ability of the system to withstand a major disruption within acceptable performance degradation and to recover within an acceptable time frame. In this monograph we consider two possible sources of major disruptions, i.e., component faults and cyber intrusions. A component fault is an indigenous activity that renders unavailability or inaccessibility of certain functions within a component, either permanently or temporarily. It typically generates safety and performance concerns. Cyber intrusion on the other hand is an exogenous activity that tampers privacy, confidentiality, availability, or integrity of the system. These two sources are not always independent from each other. For example, a cyber intrusion may trigger a component fault, whereas a component fault may open a door for cyber intrusion, e.g., by keeping it undetected. For cyber intrusion, we will focus on opacity, which describes the systems ability to hide certain secrets from an external observer (or eavesdropper), and sensor and actuator attacks that exploit the systems existing controller to generate undesirable behaviours.

In this monograph, we provide a detailed account of most recent research outcomes on fault diagnosis, opacity analysis and enhancement, and cyber security analysis and enforcement, within suitable discrete event system modelling frameworks. In each case, we describe basic problem statements and key concepts, and then point out the key challenges in each research area. After that, we present a thorough review of state-of-the-art techniques, and discuss their advantages and disadvantages. Finally, we highlight key research directions for further exploration.

ISBN: 978-1-68083-856-5
https://www.nowpublishers.com/article/Details/SYS-024

3.2 Introduction to Discrete Event Systems

Authors: Christos Cassandras and Stéphane Lafortune

Description: Christos Cassandras and Stéphane Lafortune are happy to announce the publication of the third edition of their textbook, Introduction to Discrete Event Systems, by Springer in November 2021. The first two editions of this popular textbook were published in 1999 (Kluwer Academic Publishers) and 2008 (Springer), respectively. This unique textbook comprehensively introduces the field of discrete event systems, offering a breadth of coverage that makes the material accessible to readers of varied backgrounds. The book emphasizes a unified modeling framework that transcends specific application areas, linking the following topics in a coherent manner: language and automata theory, supervisory control, Petri net theory, Markov chains and queueing theory, discrete-event simulation, and perturbation analysis and concurrent estimation techniques. The third edition is a superset of the second one, with new material added based on our teaching of discrete event systems courses at Boston University and at the University of Michigan, and they reflect active research trends in discrete event systems since the publication of the second edition.

Topics and features:
- detailed treatment of automata and language theory in the context of discrete event systems, including application to state estimation and diagnosis
- comprehensive coverage of centralized and decentralized supervisory control
- timed models, including timed automata and hybrid automata - stochastic models for discrete event systems and controlled Markov chains
- discrete event simulation - an introduction to stochastic hybrid systems
- sensitivity analysis and optimization of discrete event and hybrid systems
- new in the third edition: opacity properties, enhanced coverage of event diagnosis and of supervisory control under partial observation, overview of latest software tools, updated treatment of Infinitesimal Perturbation Analysis and of concurrent estimation

This proven textbook is essential to students and researchers in a variety of disciplines where the study of discrete event systems is relevant: control, communications, computer engineering, computer science, manufacturing engineering, transportation networks, operations research, and industrial engineering. This book is available through SpringerLink as an e-book (PDF and EPUB formats) or as a print-on-demand hard cover at https://link.springer.com/book/10.1007/978-3-030-72274-6 The e-book is available for free download at Springer subscribing institutions.

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4 Call for Papers

4.1 Advanced Robotics: Special Issue on Control Technology for Networked and Distributed Robotics

Guest Editors:

- Prof. Masaaki Nagahara (The University of Kitakyushu, Japan)
- Prof. Kai Cai (Osaka City University, Japan)
- Prof. Takeshi Hatanaka (Tokyo Institute of Technology, Japan)
- Prof. Yutaka Hori (Keio University, Japan)
- Prof. Hideaki Ishii (Tokyo Institute of Technology, Japan)

Lead Guest Editor

- Prof. Debasish Chatterjee (Indian Institute of Technology Bombay, India)
- Prof. Nikhil Chopra (The University of Maryland, USA)
- Prof. Daniel E. Quevedo (Queensland University of Technology, Australia)
- Prof. Michel Reniers (Eindhoven University of Technology, Netherlands)

Publication in Vol. 37, Issue 1 (January 2023)

Submission deadline: 28 February 2022

Control technology is one of the fundamental disciplines of robotics. The technology has been developed for more than 100 years and expanded in many research areas. In particular, control technology for networked and distributed robotics has been recently emerging thanks to the development of embedded systems and wireless communications. An example of networked and distributed robotics is a drone light show, which was presented in the opening ceremony of Tokyo Olympic Games 2020, where multiple drones are operated from the main computer located on the ground that controls multiple drones through wireless networks. The purpose of this special issue is to present recent theory and practice of control technology that can be effectively applied to networked and distributed robotics. It aims at collecting a representative body of innovative theoretical contributions that have potential applications to networked and distributed robotics as well as applicative robotics researches that show successful implementation of recent theory of networked and distributed control. Prospective contributed papers are invited to cover, but are not limited to, theoretical and applicative researches on the following topics

- control of multi-agent systems (e.g. consensus control, coverage control, formation)
- networked control systems
- discrete-event systems and hybrid systems
- resource-aware control (e.g. event-triggered control, sparse control)
- secure, resilient, and safe control
- machine learning and data driven methods for networked robotics
- human-in-the-loop and human-machine interaction

The full-length manuscript (either PDF or Microsoft Word file) should be sent to the office of Advanced Robotics, Robotics Society of Japan, through its homepage at: https://www.rsj.or.jp/pub/ar/submission.html. Templates for the manuscript as well as instructions for the Authors are available at the homepage.

Further information will be provided via the following website: (to be opened soon)

4.2 IEEE Control Systems Letters
Fragility and Resiliency in Cyber-Physical Discrete Event Systems

Guest Editors:

- Prof. Christoforos N. Hadjicostis (University of Cyprus, Cyprus)
- Prof. Stéphane Lafortune (University of Michigan, USA)
- Prof. Carla Seatzu (University of Cagliari, Italy)

The proliferation of digital technologies and interconnectivity has led to emergence of cyber-physical systems (CPS) in numerous applications, ranging from automated manufacturing systems and chemical processes to traffic networks and healthcare/information systems. CPS typically involve computation, networking and physical processes, by increasingly deploying sensors and actuators into smart feedback loops that connect the cyber and physical worlds to a multitude of computing and storage devices. These approaches have revolutionized numerous aspects of the scientific and commercial worlds (e.g., smart grids and microgrids, traffic networks, automated or autonomous transportation systems, water networks, etc.), and have led to systems (with discrete, continuous, or hybrid dynamics) of unprecedented interconnectivity. Apart from challenges due to the sheer size, complexity, and distributed nature of CPS, some of the most pressing open questions are issues of fragility and resiliency. Fragility is a term used to characterize situations where cumulative mild abnormalities (e.g., certain combinations of sensor failures, delays/losses in the transmission of sensory information and actuation commands, and/or malicious actions) result in large degradation in system performance or even unacceptable violations of system requirements. Resiliency is the ability of the system to cope with such abnormalities. Fragility analysis and resiliency provision are particularly important in CPS that involve critical infrastructures where human lives may be at risk.

The focus of this special issue is on models that comprise (compositions of) discrete event systems (DES), such as finite automata and Petri nets. In more detail, the goal of the special issue is that of collecting contributions that address fundamental research challenges that directly influence fragility and resiliency, such as losses, delays or malicious manipulations of sensory information or control commands. The primary aspect of any contribution should be novelty and originality. Also, the results should be presented in a mathematical language, according to the L-CSS standard. Specific topics of interest for this special issue include, but are not limited to:

- Cyber-physical DES fragility analysis
- Cyber-physical DES resiliency provision
- Supervisory control
- State estimation
- Detectability analysis
- Detectability analysis
- Opacity verification and enforcement
- Prognosability analysis

Submission Information

- Submission for the special issue start: December 20, 2021
- Submission deadline: January 31, 2022

Submission instructions can be found in the L-CSS website at http://ieee-cssletters.dei.unipd.it/Page_authors.php?p=1

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5 Software Tools

5.1 IDES: An Open-Source Software Tool

IDES, the discrete-event systems software tool in Karen Rudie's lab is now available as open-source software at https://github.com/krudie/IDES. More information on IDES can also be found at https://www.ece.queensu.ca/people/K-Rudie/qdes.html#fndtn-software.

5.2 Supremica 2.6, New Version

The development team has just released a new version of Supremica, Waters/Supremica IDE 2.6.

Supremica is a DES and SCT drawing and calculation tool, that includes a multitude of efficient algorithms for modeling, verification, and synthesis of maximally permissive supervisors. In addition there are general algorithms for standard operations like synchronization, minimization, determinization, etc. Supremica also handles finite automata extended with bounded discrete variables. A feature-full simulation tool is also included.

New in this version:

- Scaling of the GUI
- Revamped configuration dialog
- New analyzer user interface
- Logging can now be done directly to file, in addition to the log output pane
- Automaton variables have been introduced, so that guards and actions can refer to the state of an automaton
- The normalizing compiler is now the default
- Plenty of bug fixes, including more graceful termination when out of memory

Supremica is free to use for education and research; for commercial use, please contact fabian@chalmers.se. Download from www.supremica.org.

5.3 UltraDES 2.2 Release

UltraDES is an open-source library to the modeling, analysis and control of DES, written using C# in .NET Standard 2.0, which allows its use in multiple platforms, such as Windows, Linux, Mac, IOS, Android, so on. The library is under development at LACSED (Laboratory of Analysis and Control of Discrete Event Systems, at the Universidade Federal de Minas Gerais, Brazil) and has basic operations with automata as long as the monolithic, modular and local modular supervisory control (Alves et. al., 2017).

The main improvements of the UltraDES 2.2 version are:

- Supervisor Reduction Algorithm (Su and Wonham, 2004)
- Supervisor Localization (Cai and Wonham, 2010)
- Basic Petri Nets Functions (incidence matrix, coverability/reachability graph, Petri Net marking simulation, etc.)

Knowing that many researchers/students are not familiar with the C# language, we created an experimental python wrapper, that is less object oriented and easier to use.

Another initiative to improve the usability of UltraDES was the creation of a Web Application, developed using Blazor/WebAssembly, that allows the use of UltraDES online. This version is more limited in processing power and memory but it is useful for small examples and teaching.

We invite the community to download and contribute. Algorithms implemented may be integrated to the main distribution. Just let us know. Contact Lucas Alves lucasvra@ufmg.br or Patricia Pena ppena@ufmg.br for more information. Bugs should be informed using the UltraDES GitHub page.
Link: https://github.com/lacsed/UltraDES.

5.4 DESpot 1.10.0 Released

DESpot is a discrete-event system (DES) software, research tool. It supports both flat projects (collection of plant and supervisor DES), and Hierarchical Interface-Based Supervisory Control (HISC) projects.

DESpot 1.10.0 supports a number of new Features:

- DESpot now targets version 4.8.7 of the Qt libraries, RedHat Enterprise Linux 7.x, and MS Windows 10 with MS Visual Studios 2019.
- Support for defining template DES, and then instantiating multiple copies for flat or HISC projects.
- Now includes curved transition arrows for DES diagrams, and the ability to export DES diagrams to EPS.
- Support for verification of timed controllability, including BDD-based algorithms.
- Support for Fault-Tolerant (FT) Supervisory Control, including both timed and untimed controllability and nonblocking BDD-based algorithms, for several fault scenarios.
- Support for specifying decentralized supervisory control structure for a project, and verifying coobservability.

To find out more information and to download a copy, see: http://www.cas.mcmaster.ca/~leduc/DESpot.html

DESpot is open source software, released under the GNU General Public license (GPL), version 2.

DESpot is written in C++ and uses the QT GUI libraries. At the moment, DESpot is available as source code and as a Windows' installer. It runs under Linux, and Windows.

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