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School of Electro-Mechanical Engineering (SEME)
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Research Interests

Systems and control theory, cyber-physical systems, discrete event systems

Automaton & Petri net theories, supervisory control theory

Fault diagnosis & prognosis, state estimation, resource optimization, information security

Personal

Born in November, 1984, in Xian, ShaanXi province, China.

Chinese citizen.

Employment

All in Xidian University, China.

September 2019 – now: Associate Professor, School of Electro-Mechanical Engineering.

January 2014 – September 2019: Assistant Professor, School of Electro-Mechanical Engineering.

July 2011 – December 2013: Assistant Professor, School of Electronic Engineering.

Education

Ph.D. in *Electro-Mechanical Engineering*, School of Electro-Mechanical Engineering, Xidian University, **2016**.

Ph.D. (cotutorship) in *Electronic and Information Engineering*, Department of Electrical and Electronic Engineering, University of Cagliari, **2016**.

M.Sc. in *Macromolecular Chemistry and Physics*, College of Chemistry and Molecular Engineering, Peking University, **2011**.

B.Sc. in *Chemistry*, College of Chemistry and Molecular Engineering, Peking University, **2007**.

B.Ec. (double degree) in *Economics*, China Center for Economic Research, Peking University, **2007**.

Academic Visiting

University of Toronto (Department of Electrical & Computer Engineering), January - April, **2019**.

University of Cagliari (Department of Electrical and Electronic Engineering), January - December, **2015**;

University of Cagliari (Department of Electrical and Electronic Engineering), July - September, **2013**;

Projects

Hosting/ed Projects

Fault Diagnosis and Prognosis in Discrete Event System Modeled by Petri Nets, ShaanXi Provincial Science Foundation, Grant No. 2022JM-323, **2022–2023**.

Supervisor Design in Discrete-Event Systems Modeled by Petri Nets, High-End Foreign Experts Project, Ministry of Science and Technology of China, **2022–2023**.

Marking Diagnosis in Partially Observable Petri Nets, Fundamental Research Funds for the Central Universities, China, Grant No. JB210413, **2021–2022**.

Design of State and Behavioral Supervisors in Petri Nets, National Natural Science of Foundation of China, Grant No. 61703321, **2018–2020**.

Design of Supervisors in Partially Observable Petri Nets, ShaanXi Provincial Science Foundation, Grant No. 2019JQ-022, **2019–2020**.

Supervision of Partially Observable Petri Nets, Fundamental Research Funds for the Central Universities, China, Grant No. JB190407, **2019–2020**.

Supervision and Optimization in Petri Nets, Fundamental Research Funds for the Central Universities, China, Grant No. JBF180401-15, **2018**.

Supervision and Reconfiguration of Discrete Event Systems, Fundamental Research Funds for the Central Universities, China, Grant No. JB142001-15, **2014**.

Participating/ed Projects

Defensive Strategy of Network Attacks in Discrete Event Dynamic System Under Detection-Protection Mechanism, National Natural Science of Foundation of China, Grant No. 62373313, **2024–2027**.

Design and Optimization of Supervisors in Pure Petri Nets. National Natural Science of Foundation of China, Grant No. 61673309, **2017–2020**.

Supervision and Reconfiguration of Discrete Event Systems. National Natural Science of Foundation of China, Grant No. 61472295, **2015–2018**.

Prizes and Honors

2022: *First Prize* of the *Outstanding Achievement Award for Scientific and Technological Research of Shaanxi Univerisities/Institutions* (China), for "Modeling, Control, and Reconfiguration in Discrete Event Dynamic Systems".

Academic Activities

Academic Services

Technical Committee Member of IEEE Control System Society on Discrete Event Systems (IEEE-CSS-DES) since 2017

Conference Associate Editor of

CASE'23: 19th IEEE International Conference on Automation Science and Engineering (Auckland, New Zealand, 2023)

CASE'22: 18th IEEE International Conference on Automation Science and Engineering (Mexico City, Mexico / hybrid, 2022)

CASE'21: 17th IEEE International Conference on Automation Science and Engineering (Lyon, France, 2021)

CASE'20: 16th IEEE International Conference on Automation Science and Engineering (Virtual [online], China, 2020)

CASE'19: 15th IEEE International Conference on Automation Science and Engineering (Vancouver, Canada, 2019)

CASE'18: 14th IEEE International Conference on Automation Science and Engineering (Munich, Germany, 2018)

CASE'17: 13th IEEE International Conference on Automation Science and Engineering (Xi'an, China, 2017)

SMC'23: 2023 IEEE International Conference on Systems, Man, and Cybernetics (Oahu, Hawaii, 2023)

SMC'22: 2022 IEEE International Conference on Systems, Man, and Cybernetics (Prague, Czech Republic, 2022)

SMC'21: 2021 IEEE International Conference on Systems, Man, and Cybernetics (Melbourne, Australia, 2021)

SMC'20: 2020 IEEE International Conference on Systems, Man, and Cybernetics (Virtual [online], 2020)

SMC'19: 2019 IEEE International Conference on Systems, Man, and Cybernetics (Bari, Italy, 2019)

ECC'23: 2023 European Control Conference (Bucharest, Romania, 2023)

ECC'22: 2022 European Control Conference (London, UK / hybrid, 2022)

ECC'21: 2021 European Control Conference (Virtual [online], 2021)

ECC'20: 2020 European Control Conference (Virtual [online], 2020)

ECC'19: 2019 European Control Conference (Naples, Italy, 2019)

Conference Track Program Committee Member of

ETFA'23: 28th International Conference on Emerging Technologies and Factory Automation (Sinaia, Romania, 2023)

ETFA'22: 27th International Conference on Emerging Technologies and Factory Automation (Stuttgart, Germany, 2022)

ETFA'21: 26th International Conference on Emerging Technologies and Factory Automation (Västerås, Sweden, 2021)

ETFA'20: 25th International Conference on Emerging Technologies and Factory Automation (Vienna, Austria, 2020)

ETFA'19: 24th International Conference on Emerging Technologies and Factory Automation (Zaragoza, Spain, 2019)

ETFA'18: 23rd International Conference on Emerging Technologies and Factory Automation (Torino, Italy, 2018)

ETFA'17: 22nd International Conference on Emerging Technologies and Factory Automation (Limassol, Cyprus, 2017)

VECoS'20: Formal Verification and Evaluation of Computer and Communication Systems (Virtual [online], 2020)

Local Organizing Committee Member of

WODES'16: the 13th IEEE International Workshop on Discrete Event Systems (Xi'an, China, 2016).

ETFA'13: the 18th IEEE International Conference on Emerging Technologies and Factory Automation (Cagliari, Italy, 2013).

Conference Session Organization and Chairing

Co-organized an invited session on "*Safety and Security of Discrete Event Systems*" during the 41st American Control Conference (ACC'22), June, 2022.

Co-organized and chaired an invited session on "*Supervision and Estimation of Automated Systems using Discrete-Event Systems*" during the 15th IEEE International Conference on Automation Science and Engineering (CASE'19), August, 2019.

Journal Reviewer of

IEEE Transactions on Automatic Control (*Outstanding Reviewer Award in 2016*)

Automatica

IEEE Transactions on System, Man, and Cybernetics: Systems

IEEE Transactions on Automation Science and Engineering

IEEE Transactions on Control Systems Technology

Discrete Event Dynamic Systems: Theory and Applications

IEEE Control System Letters (*Outstanding Reviewer Award in 2022*)

IEEE Robotics and Automation Letters

Information Science

IEEE Access

etc.

Conference Reviewer of

IEEE International Conference on Decision and Control (CDC)

IEEE International Conference on Automation Science and Engineering (CASE)

American Control Conference (ACC)

IFAC World Congress (IFAC WC)

European Control Conference (ECC)

Workshop on Discrete Event Systems (WODES)

etc.

Academic Publications

Click on a [**colored**] identifier will navigate you to the publisher's page.
You are welcome to request any papers listed in this CV: please mail to: maziyue@xidian.edu.cn.

Journal Articles

WOS-Indexed Journals

[**2024tac**] **Z. Ma**, Y. Tong, C. Seatzu. "Pattern-Pattern Diagnosability in Partially Observed Discrete Event Systems", *IEEE Transactions on Automatic Control*, **2024**, in press.

[**2024tase**] Y. Hu, **Z. Ma**, Z. Li. "Design of Supervisors for Partially Observed Discrete Event Systems Using Quiescent Information", *IEEE Transactions on Automation Science and Engineering*, **2023**, in press.

[**2023cep**] P. Lv, G. Luo, **Z. Ma**, S. Li, X. Yin. "Optimal Multi-robot Path Planning for Cyclic Tasks Using Petri Nets", *Control Engineering Practice*, **2023**, 138, Article 105600.

[**2023tsmc**] L. Yang, **Z. Ma**, Z. Li, A. Giua. "Rumor Containment by Blocking Nodes in Social Networks", *IEEE Transactions on Systems, Man and Cybernetics: Systems*, **2023**, 53(7): 3990-4002.

[**2023tac**] Y. Tong, **Z. Ma**. "Verification of k-Step and Definite Critical Observability in Discrete-Event Systems", *IEEE Transactions on Automatic Control*, **2023**, in press.

[**2022ral**] W. Shi, Z. He, W. Tang, W. Liu, **Z. Ma**. "Path Planning of Multi-robot Systems with Boolean Specifications Based on Simulated Annealing", *IEEE Robotics and Automation Letters*, **2022**, 7(3), 6091-6098. (WOS: 000785670500002, EI: 20221511959074)

[**2022tsmc**] C. Gu, **Z. Ma**, Z. Li, A. Giua. "Verification of Nonblockingness in Bounded Petri Nets with Min-Max Basis Reachability Graphs", *IEEE Transactions on Systems, Man and Cybernetics: Systems*, **2022**, 52(10): 6162-6173. (WOS: 000742676800001, EI: 20220411531805)

[**2022aut**] **Z. Ma**, Z. He, Z. Li, A. Giua. "Design of Supervisors for Linear Marking Specifications in Labeled Petri Nets", *Automatica*, **2022**, 136 (February), Article 110031. (WOS: 000820880400009, EI: 20214911259675)

[**2022tac-b**] **Z. Ma**, M. Zou, J. Zhang, Z. Li. "Design of Optimal Control Sequences in Petri Nets Using Basis Marking Analysis", *IEEE Transactions on Automatic Control*, **2022**, 67(7): 3685-3692. (WOS: 000818858700046, EI: 20213510843639)

[**2022tac-a**] **Z. Ma**, K. Cai. "Optimal Secret Protections in Discrete Event Systems", *IEEE Transactions on Automatic Control*, **2022**, 67(6): 2816-2828. (WOS: 000803343800013, EI: 20213410806865)

[**2021nahs**] Z. He, **Z. Ma**. "Performance Safety Enforcement in Stochastic Event Graphs against Boost and Slow Attacks", *Nonlinear Analysis: Hybrid Systems*, **2021**, 41 (August), Article 101057. (WOS: 000659281400024, EI: 20212010349765)

[**2021aut-d**] **Z. Ma**, X. Yin, Z. Li. "Verification and Enforcement of Strong Infinite- and k-Step Opacity Using State Recognizers", *Automatica*, **2021**, 133 (November), Article 109838. (WOS: 000702835200040, EI: 20213310784320)

[**2021aut-c**] Y. Hu, **Z. Ma**, Z. Li. "Diagnosability Enforcement in Labeled Petri Nets Using Supervisory Control", *Automatica*, **2021**, 131 (September), Article 109776. (WOS: 000675832700001, EI: 20212710587933)

[**2021aut-b**] **Z. Ma**, X. Yin, Z. Li. "Marking Diagnosability Verification in Labeled Petri Nets", *Automatica*, **2021**, 131 (September), Article 109713. (WOS: 000674621200044, EI: 20212610575696)

[**2021aut-a**] Z. He, **Z. Ma**, W. Tang. "Performance Safety Enforcement in Strongly Connected Timed Event Graphs", *Automatica*, **2021**, 128 (June), Article 109605. (WOS: 000640388800019, EI: 20211410166683)

[**2021tac-b**] **Z. Ma**, X. Yin, Z. Li. "Marking Predictability and Prediction in Labeled Petri Nets", *IEEE Transactions on Automatic Control*, **2021**, 66(8): 3608-3623. (WOS: 000678334500016, EI: 2020-3909232912)

[**2021tac-a**] **Z. Ma**, G. Zhu, Z. Li. "Marking Estimation in Petri Nets Using Hierarchical Basis Reachability Graphs", *IEEE Transactions on Automatic Control*, **2021**, 66(2): 810-817. (WOS: 000613403900028, EI: 20210609887865)

[**2021jas**] Z. He, **Z. Ma**, Z. Li, A. Giua. "Parametric Transformation of Timed Weighted Marked Graphs: Applications in Optimal Resource Allocation", *IEEE/CAA Journal of Automatica Sinica*, **2021**, 8(1), 179-188. (WOS: 000594739100015, EI: 20204909591393)

[**2020tac-c**] Y. Hu, **Z. Ma**, Z. Li. "Design of Supervisors for Active Diagnosis in Discrete Event Systems", *IEEE Transactions on Automatic Control*, **2020**, 65(12): 5159-5172. (WOS: 000595526300011, EI: 20205109648497)

[**2020tac-b**] **Z. Ma**, G. Zhu, Z. Li, A. Giua. "Computation of Admissible Marking Sets in Weighted Synchronization-Free Petri Nets by Dynamic Programming", *IEEE Transactions on Automatic Control*, **2020**, 65(6): 2662-2669. (WOS: 000542947800028, EI: 20194007488688)

[**2020tac-a**] **Z. Ma**, Z. Li, A. Giua. "Marking Estimation in a Class of Time Labeled Petri Nets", *IEEE Transactions on Automatic Control*, **2020**, 65(2): 493-506. (WOS: 000510754000003, EI: 202009-08212107)

[**2019deds**] Z. He, M. Liu, **Z. Ma**, Z. Li, A. Giua. "An Improved Approach for Marking Optimization of Timed Weighted Marked Graphs", *Discrete Event Dynamic Systems*, **2019**, 29(2): 127-143. (WOS: 000472526400001, EI: 20190806529446)

[**2017tac-b**] **Z. Ma**, Z. Li, A. Giua. "Characterization of Admissible Marking Sets in Petri Nets with Conflicts and Synchronizations", *IEEE Transactions on Automatic Control*, **2017**, 62(3): 1329-1341. (WOS: 000395924300022, EI: 20171103444853, **ESI Highly Cited Paper**)

[**2017tac-a**] **Z. Ma**, Y. Tong, Z. Li, A. Giua. "Basis Marking Representation of Petri Net Reachability Spaces and Its Application to the Reachability Problem", *IEEE Transactions on Automatic Control*, **2017**, 62(3): 1078-1093. (WOS: 000356871400004, EI: 20155201734474, **ESI Highly Cited Paper**)

[**2016aut**] **Z. Ma**, Z. Li, A. Giua. "Petri Net Controllers for Generalized Mutual Exclusion Constraints with Floor Operators", *Automatica*, **2016**, 74 (December): 238-246. (WOS: 000389087200028, EI: 20164002875779)

[**2015aut**] **Z. Ma**, Z. Li, A. Giua. "Comments on 'Maximally Permissive Supervisor Synthesis Based on a New Constraint Transformation Method' ", *Automatica*, **2015**, 51 (January): 131-134. (WOS: 000348015500016, EI: 20150300420825)

[**2015tac**] **Z. Ma**, Z. Li, A. Giua. "Design of Optimal Petri Net Controllers for Disjunctive Generalized Mutual Exclusion Constraints", *IEEE Transactions on Automatic Control*, **2015**, 60(7): 1774-1785. (WOS: 000356871400004, EI: 20155201734474, **ESI Highly Cited Paper**)

EI-Indexed and CN Journals

[**2022lcsys-b**] **Z. Ma**, K. Cai. "On Resilient Supervisory Control Against Indefinite Actuator Attacks in Discrete-Event Systems", *IEEE Control System Letters*, **2022**, 6, 2942-2947. (EI: 2022-1812062145)

[**2022lcsys-a**] C. Gu, **Z. Ma**, Z. Li, A. Giua. "Non-Blockingness Verification of Bounded Petri Nets Using Basis Reachability Graphs", *IEEE Control System Letters*, **2022**, 6, 1220-1225. (EI: 20213010683337)

[**2023jxdu**] M. Zou, **Z. Ma**. "An Efficient Method to Design Optimal Control Sequences in Petri Nets", in Chinese, *Journal of Xidian University*, **2023**, 49(3): 199-205. (EI: 20222612303029)

[**2016jxdu**] **Z. Ma**, Y. Tong. "Supervisor Synthesis in Petri Nets Based on Basis Marking Graphs", in Chinese, *Journal of Xidian University*, **2016**, 43(6): 68-73. (EI: 20165203176180)

[**2015jxdu**] Z. Jiang, X. Zhang, **Z. Ma**. "Capacity Optimization for Power Storage Systems in Smart Grids", in Chinese, *Journal of Xidian University*, **2015**, 42(6): 106-112. (EI: 20160101750463)

Peer-reviewed Conference Papers

[**2023cdc**] W. Shi, Z. He, **Z. Ma**, N. Ran, X. Yin, "Security-preserving multi-robot path planning for Boolean specification tasks using labeled Petri nets", *62nd IEEE Conference on Decision and Control* (CDC'23), Marina Bay Sands, Singapore, **2023**, to appear.

[**2023ifac**] **Z. Ma**, K. Cai, "Optimal Secret Protection in Discrete Event Systems with Dynamic Clearance Levels", *22nd IFAC World Congress* (IFAC'23), Yokohama, Japan, **2023**, to appear.

[**2022wodes-b**] P. Lv, G. Luo, X. Yin, **Z. Ma**, S. Li, "Optimal Multi-Robot Path Planning for Cyclic Tasks Using Petri Nets", *16th International Workshop on Discrete Event Systems* (WODES'22), Prague, Czechia, **2022**: 9-15.

[**2022wodes-a**] M. Zou, Y. Tong, **Z. Ma**, "PNBA: A Software for Marking Estimation and Reconfiguration in Petri Nets Using Basis Marking Analysis", *16th International Workshop on Discrete Event Systems* (WODES'22), Prague, Czechia, **2022**: 180-187.

[**2022icaibd**] R. Nan, X. Zhu, D. Wang, **Z. Ma**, "A Realization of Self-face Diagnosis Algorithm Based on Chinese Medicine Theory", 5th International Conference on Artificial Intelligence and Big Data (ICAIBD 2022), Chengdu, China, **2022**, 205-210.

[**2022acc**] J. Jiang, **Z. Ma**, K. Cai, "Secret Protections in Discrete-Event Systems with Minimum Costs", *41st American Control Conference* (ACC'22), Atlanta, USA, **2022**: 3740-3745.

[**2021cdc/lcsys**] C. Gu, **Z. Ma**, Z. Li, A. Giua. "Non-Blockingness Verification of Bounded Petri Nets Using Basis Reachability Graphs", *60th IEEE Conference on Decision and Control* (CDC'21), Austin, USA, **2021**. A joint submission of *IEEE Control Systems Letters*, see [**2022lcsys-a**].

[**2020cdc-b**] **Z. Ma**, J. Zhang, "Determining Optimal Control Sequences for Reconfiguration in Petri Nets", *59th IEEE Conference on Decision and Control* (CDC'20), Virtual [Online], **2020**: 4485-4491. (EI: 20210509848156)

[**2020cdc-a**] **Z. Ma**, X. Yin, Z. Li, "Marking Diagnosis in Labeled Petri Nets Using Basis Diagnosers", *59th IEEE Conference on Decision and Control* (CDC'20), Virtual [Online], **2020**: 4479-4484. (EI: 20210509848067)

[**2020ifac**] L. Yang, **Z. Ma**, Z. Li, A. Giua, "Rumor containment by blocking nodes in social networks", *21st IFAC World Congress* (IFAC'20), Virtual (online), **2020**. (Oral Presentation)

[**2019cdc**] C. Gu, **Z. Ma**, Z. Li, A. Giua, "Verification of Nonblockingness in Bounded Petri Nets with a Semi-Structural Approach", *IEEE 58th Conference on Decision and Control* (CDC'19), Nice, France, **2019**: 6718-6723. (EI: 20201408369463)

[**2019case-b**] Y. Hu, **Z. Ma**, Z. Li, "Active Diagnosis of Petri Nets Using Q-Diagnoser", *IEEE 15th International Conference on Automation Science and Engineering* (CASE'19), Vancouver, Canada, **2019**: 203-208. (EI: 20194107517745)

[**2019case-a**] **Z. Ma**, Z. He, Z. Li, "Supervisory Control in Partially Observable Petri Nets with Sensor Reduction", *IEEE 15th International Conference on Automation Science and Engineering* (CASE'19), Vancouver, Canada, **2019**: 189-194. (EI: 20194107517567)

[**2018wodes**] **Z. Ma**, Z. He, Z. Li, A. Giua, "Design of Monitor-based Supervisors in Labelled Petri Nets", *14th International Workshop on Discrete Event Systems* (WODES'18), Sorrento Coast, Italy, **2018**: 374-380. (EI: 20183005584446)

[**2017cdc**] **Z. Ma**, Z. Li, A. Giua, "Computation of Admissible Marking Sets in Weighted State Machines by Dynamic Programming", *56th IEEE Conference on Decision and Control* (CDC'17), Melbourne, Australia, **2017**: 4847-4852. (EI: 20181805127767)

[**2017ifac**] **Z. Ma**, Y. Tong, Z. Li, A. Giua, "Marking Estimation in Labelled Petri Nets by the Representative Marking Graph", *20th IFAC World Congress* (IFAC'17), Toulouse, France, **2017**: 11175-11181. (EI: 2005108874929)

[**2016acc**] Y. Tong, **Z. Ma**, Z. Li, C. Seatzu, A. Giua, "Verification of Language-Based Opacity in Petri Nets Using Verifier", *35th American Control Conference* (ACC'16), Boston, USA, **2016**: 757-763. (EI: 20164302948709)

[**2016wodes**] Y. Tong, **Z. Ma**, Z. Li, C. Seatzu, A. Giua. "Supervisory Enforcement of Current-State Opacity with Uncomparable Observations", *13th International Workshop on Discrete Event Systems* (WODES'16), Xi'an, China, **2016**: 313-318. (EI: 20163302716651)

[**2015cdc**] **Z. Ma**, Z. Li, A. Giua. "A Method to Verify the Controllability of Language Specifications in Petri Nets Based on Basis Marking Analysis", In *54th IEEE Conference on Decision and Control* (CDC'15), Osaka, Japan, **2015**: 1675-1681. (EI: 20161402197152)

[**2015acc**] **Z. Ma**, Z. Li, A. Giua. "A Constraint Transformation Technique in Petri Nets with Backward-Conflict-Free Uncontrollable Structures", *34th American Control Conference* (ACC'15), Chicago, USA, **2015**: 365-370. (EI: 20153701252581)

[**2014ifac**] **Z. Ma**, Z. Li, A. Giua. "An Approach to Determine Controllability of Monolithic Supervisors", *19th IFAC World Congress* (IFAC'14), Cape Town, South Africa, **2014**: 2429-2434. (EI: 20152200885658)

[**2014wodes**] **Z. Ma**, Z. Li, A. Giua. "A Constraint Transformation Technique for Petri Nets with Certain Uncontrollable Structures", *12th International Workshop on Discrete Event Systems* (WODES'14), Cachan, France, **2014**: 66 – 72. (EI: 20154501491425)

[**2013etfa**] **Z. Ma**, Z. Li, A. Giua. "Petri Net Controllers for Disjunctive Generalized Mutual Exclusion Constraints", *18th IEEE International Conference on Emerging Technologies and Factory Automation* (ETFA'13), Cagliari, Italy, **2013**: 1-8. (EI: 20135217133640)