LISTA PUBLICAŢIILOR REZULTATE ÎN URMA CERCETĂRII DOCTORALE, PUBLICATE SAU ACCEPTATE SPRE PUBLICARE, SUB AFILIERE UPT

Ing. *Elida-Gabriela TULCAN* student doctorand

1. Lucrări ştiinţifice publicate în reviste indexate Web of Science-WoS (ISI)

1. E.C. Lovasz, V. Ciupe, T. Demjen, A. Oarcea, **E.G. Tulcan**, M.O. Sandu, "Optimal Synthesis of Five-Bar Linkage Based on Singularity-Free Workspaces with Predefined Shapes", *ROBOTICS*, vol. 13, no. 12, article 173, December 2024 (WOS:001384554800001).
2. N.G. Crăciun, **E.G. Tulcan**, A. Oarcea, C. Ciapa, E.C. Lovasz, "Wrist Exoskeleton Actuated by a 2-RRU-U Parallel Manipulator", *MACHINES*, vol. 12, no. 12, article 945, December 2024 (WOS:001384618700001).
3. **E.G. Tulcan**, C. Sticlaru, A. Oarcea, M.O. Sandu, E.C. Lovasz, "Feasibility Study of the Seven-Bar Linkage 7-PR(RRRR)RP Used for Medical Disinfection Robot", *ROBOTICS*, vol. 13, no. 12, article 177, December 2024 (WOS:001385630700001).
4. M.O. Sandu, V. Ciupe, C.M. Gruescu, R. Kristof, C. Sticlaru, **E.G. Tulcan**, "Determining the Proper Force Parameters for Robotized Pipetting Devices Used in Automated Polymerase Chain Reaction (PCR)", *ROBOTICS*, vol. 14, no. 1, article 2, January 2025 (WOS:001404678600001).
5. **E.G. Tulcan**, C. Sticlaru, M.O. Sandu, E.C. Lovasz, "COMPARATIVE ANALYSIS OF THE 4-RRRP FOUR-BAR LINKAGE AND THE 7-PR(RRRR)RP SEVEN-BAR LINKAGE FOR THE DESIGN OF A MEDICAL DISINFECTION ROBOT WITH FOLDING MECHANISM", *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING*, vol. 68, no. 2, pp. 295-300, MAR-JUN 2025 (WOS:001565922600030).
6. **E.G. Tulcan**, C. Sticlaru, A. Oarcea, M.O. Sandu, E.C. Lovasz, "UNITARY KINEMATIC ANALYSIS AND SYNTHESIS OF THE SYMMETRICAL SEVEN-BAR LINKAGES FOR THE DESIGN OF MEDICAL DISINFECTION ROBOTS IN ENVIRONMENTAL APPLICATIONS", *ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL*, vol. 25, no. 2, pp. 289-299, February 2026 (WOS:001784389100004).
7. T. Demjen, A. Oarcea, **E.G. Tulcan**, E.C. Lovasz, D.C. Silaghi-Perju, L. Maries, "OPTIMAL SYNTHESIS OF THE FIVE-BAR LINKAGES WITH SYMMETRICAL STRUCTURE BY USING IMPOSED TRAJECTORIES FOR HOME TRAINING", *ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL*, vol. 25, no. 2, pp. 257-263, February 2026 (WOS:001784389100001).

2. Lucrări ştiinţifice publicate în volumele unor manifestări ştiinţifice (Proceedings) indexate Web of Science-WoS (ISI) Proceedings

1**. E.G. Tulcan**, C. Sticlaru, A. Oarcea, E.C. Lovasz, "Design of a Medical Robot with Folding Mechanism Used for Disinfection in the Hard-to-Reach Areas", in NEW TRENDS IN MEDICAL AND SERVICE ROBOTICS, MESROB 2023, vol. 133, pp. 351-359 (WOS:001437421000038).
2. **E.G. Tulcan**, C. Sticlaru, E.C. Lovasz, "Medical Disinfection Robots: Past vs Future. Improving the Disinfection Process by Using Disinfection Robots with Folding Mechanism" in 17th International Conference on Engineering of Modern Electric Systems (EMES 2023), pp. 1-4 (INSPEC:23422427).
3. **E.G. Tulcan**, C. Sticlaru, A. Oarcea, M.O. Sandu, E.C. Lovasz, "Kinematic Analysis of the Seven-Bar Linkage 7-PR(RRRR)RP Used for Medical Disinfection Robot", in ADVANCES IN SERVICE AND INDUSTRIAL ROBOTICS, RAAD 2024, vol. 157, pp. 359-367 (WOS:001295610100035).
4. A.Oarcea, **E.G. Tulcan**, R. Kristof, E.C. Lovasz, "Comparative Study of the Kinematic Performance Indices for the 3-U(RPRGR)RU and the 3-URU Parallel Robots", in ADVANCES IN SERVICE AND INDUSTRIAL ROBOTICS, RAAD 2024 vol. 157, pp. 347-357 (WOS:001295610100034).
5. A. Oarcea, **E.G. Tulcan**, D. Buncianu, E.C. Lovasz, "Kinematic Analysis of the 4-U(RPRGR)RU Redundant Parallel Robot", in MECHANISM DESIGN FOR ROBOTICS, MEDER 2024, vol. 166, pp. 361-370 (WOS:001329880600038).
6. **E.G. Tulcan**, A. Oarcea, C. Sticlaru, M. Ceccarelli, E.C. Lovasz, "Analytical Synthesis of the Seven-Bar Linkage 7-PR(RRRR)RP Used for Medical Disinfection Robot", in MECHANISM DESIGN FOR ROBOTICS, MEDER 2024, vol. 166, pp. 334-344 (WOS:001329880600035).
7. N.G. Crăciun, **E.G. Tulcan**, C. Ciapa, E.C. Lovasz, "Wrist Exoskeleton Actuated by a Parallel Manipulator", in MECHANISM DESIGN FOR ROBOTICS, MEDER 2024, vol. 166, pp. 182-192 (WOS:001329880600019).
8. I.E. Popescu, F. Florescu, C.E. Moldovan, D. Buncianu, **E.G. Tulcan**, E.C. Lovasz, "Noncircular Cable-Pulley Mechanisms Used for Equilibrating the Wheelchair Backrest", in MECHANISM DESIGN FOR ROBOTICS, MEDER 2024, vol. 166, pp. 53-62 (WOS:001329880600006).

9. E.C. Lovasz, M. Ceccarelli, **E.G. Tulcan**, A. Oarcea, D.C. Silaghi-Perju, C. Sticlaru, D. Buncianu, "Unitary Synthesis Method of Basic Mechanisms with Translating Driven Element", in ADVANCES IN MECHANISM DESIGN IV, TMM 2024, vol. 171, pp. 12-21 (WOS:001328769400002).
10. **E.G. Tulcan**, C. Sticlaru, N.G. Crăciun, F. Pop, E.C. Lovasz, "Medical Disinfection Robots. A Review on Disinfection Methods", in MACHINE AND INDUSTRIAL DESIGN IN MECHANICAL ENGINEERING, KOD 2024, vol. 174, pp. 853-860 (WOS:001457382100083).
11. **E.G. Tulcan**, C. Sticlaru, A. Oarcea, M.O. Sandu, E.C. Lovasz, "Comparative Analysis of the 7-RR(RRRR)RR and 7-PR(RRRR)RP Seven-Bar Linkages for the Design of a Medical Disinfection Robot with Folding Mechanism", in NEW ADVANCES IN MECHANISMS, MECHANICAL TRANSMISSIONS AND ROBOTICS, MTM & ROBOTICS 2024, vol. 178, pp. 199-207 (WOS:001512809900021).
12. I.E. Popescu, F. Florescu, D. Buncianu, **E.G. Tulcan**, A. Dobra, E.C. Lovasz, "Inverted Cardan-Gear Spring Mechanism Used for Balancing the Wheelchair Backrest and Footrest", in NEW ADVANCES IN MECHANISMS, MECHANICAL TRANSMISSIONS AND ROBOTICS, MTM & ROBOTICS 2024, vol. 178, pp. 137-146 (WOS:001512809900015).
13. A. Oarcea, **E.G. Tulcan**, E.C. Lovasz, I. Maniu, "The Influence of Link Lengths on the Kinematic Performance of the 2R Serial Robot", in NEW ADVANCES IN MECHANISMS, MECHANICAL TRANSMISSIONS AND ROBOTICS, MTM & ROBOTICS 2024, vol. 178, pp. 104-113 (WOS:001512809900012).

3. Lucrări ştiinţifice publicate în reviste de specialitate indexate BDI (cu specificarea BDI)

4. Lucrări ştiinţifice publicate în volumele unor manifestări ştiinţifice (Proceedings) indexate BDI (cu specificarea BDI)
1. **E.G. Tulcan**, A. Oarcea, E.C. Lovasz, "Kinematic Analysis of the Seven-Bar Linkage 7-RR(RRRR)RR Used for Medical Disinfection Robot", in Proceedings of I4SDG Workshop 2023, I4SDG 2023, vol. 134, pp. 171-180 (Scopus).
2. A. Oarcea**, E.G. Tulcan**, E.C. Lovasz, "Kinematic Analysis of the 3-U(RPRGR)RU Parallel Robot", in Proceedings of the Sixth MeTrApp Conference 2023, MeTrApp 2023, vol. 124, pp. 189-196 (Scopus).
3. T. Demjen, E.C. Lovasz, M. Ceccarelli, M. Russo, **E.G. Tulcan**, A. Oarcea, "Design of a 3D Printer with Five-Bar Linkage",in Proceedings of 25th International Symposium on Measurements and Control in Robotics, ISMCR 2023, vol. 154, pp. 51-59 (Scopus).
4. A. Oarcea**, E.G. Tulcan**, E.C. Lovasz, "Kinematic Performance Analysis of the 3-U(RPRGR)RU Parallel Robot", in Proceedings of 25th International Symposium on Measurements and Control in Robotics, ISMCR 2023, vol. 154, pp. 61-72 (Scopus).
5. A. Oarcea, **E.G. Tulcan**, A.M. Scurt, R. Kristof, E.C. Lovasz, "Optimal Synthesis of the 2R Serial Robot Based on Kinematic Performance Measures", in Proceedings of I4SDG Workshop 2025 - IFToMM for Sustainable Development Goals, I4SDG 2025, vol. 179, pp. 200-207 (Scopus).
6. **E.G. Tulcan**, C. Sticlaru, A. Oarcea, N.G. Crăciun, E.C. Lovasz, "Optimized Synthesis Method of the 7-RR(RRRR)RR Seven-Bar Linkage Used for Medical Disinfection Robot", in Proceedings of I4SDG Workshop 2025 - IFToMM for Sustainable Development Goals, I4SDG 2025, vol. 179, pp. 190-199 (Scopus).
7. N.G. Crăciun, C.Ciapa, **E.G. Tulcan**, R. Kristof, D. Buncianu, E.C. Lovasz, "Wrist Exoskeleton Actuated by a Parallel Manipulator with Linear Servomotors", in New Trends in Medical and Service Robotics, MESROB 2025, vol. 186, pp. 271-279 (Scopus).
8. E.C. Lovasz, M. Ceccarelli, A.M.F. Lupuți, **E.G. Tulcan**, A.M. Scurt, R.Kristof, "Novel Type Synthesis Approach of Symmetrical Planar Parallel Robots Using Kinematic Connections", in New Advances in Mechanisms, Transmissions and Applications, MeTrApp 2025, vol. 192, pp. 218-226 (Scopus).
9. A. Oarcea, **E.G. Tulcan**, O.G. Bădărău, R. Kristof, E.C. Lovasz, "The 3R Serial Robot's Optimal Synthesis Based on Kinematic Performance Measures", in Advances in Mechanisms and Machine Science, SYROM 2025, vol. 198, pp. 258-265 (Scopus).
10. M.O. Sandu, **E.G. Tulcan**, C.M. Gruescu, E.C. Lovasz, V. Ciupe, R. Kristof, C. Sticlaru, "Inverse Positional Kinematic of the Robot UR-10e Used for Automated Pipetting in PCR Laboratory", in Advances in Mechanisms and Machine Science, SYROM 2025, vol. 198, pp. 227-236 (Scopus).
11. **E.G. Tulcan**, C. Sticlaru, A. Oarcea, M.O. Sandu, E.C. Lovasz, "Optimal Synthesis of a Symmetrical Seven-Bar Linkage's Kinematic Design", in Advances in Mechanisms and Machine Science, SYROM 2025, vol. 198, pp. 31-40 (Scopus).
12. L.M. Micle, **E.G. Tulcan**, C. Sticlaru, A. Oarcea, E.C. Lovasz, "Motion Simulation for the Anatomical Reconstruction of Facial Muscles and Skulls with a Spherical 3D Printer", in Emerging Fields in Mechanism and Machine Science, EFIMMS 2026, vol. 205, pp. 264-273 (Scopus).

5. Lucrări ştiinţifice publicate în volumele unor manifestări ştiinţifice internaţionale (Proceedings) din străinătate

6. Lucrări ştiinţifice publicate în volumele unor manifestări ştiinţifice

Data: 24.06.2026

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Prof.univ.dr.ing. Erwin-Christian LOVASZ	*ing. Elida-Gabriela TULCAN*

ANEXE atașate obligatorii

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A)

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Prepared on June 24th 2026

Elida-Gabriela Tulcan

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Publications

For manuscripts published from date range June 2021 - June 2026 (18)

COMPARATIVE ANALYSIS OF THE 4-RRRP FOUR-BAR LINKAGE AND THE 7-PR(RRRR)RP SEVEN-BAR LINKAGE FOR THE DESIGN OF A MEDICAL DISINFECTION ROBOT WITH FOLDING MECHANISM
Authors (4): Tulcan, Elida-Gabriela; Sticlaru, Carmen ... Lovasz, Erwin-Christian
Published: Mar 2025 in Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering
Accession Number: WOS:001565922600030

Determining the Proper Force Parameters for Robotized Pipetting Devices Used in Automated Polymerase Chain Reaction (PCR)
Authors (6): Sandu, Melania-Olivia; Ciupe, Valentin ... Tulcan, Elida-Gabriela
Published: Jan 2025 in Robotics
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Comparative Analysis of the 7-RR(RRRR)RR and 7-PR(RRRR)RP Seven-Bar Linkages for the Design of a Medical Disinfection Robot with Folding Mechanism
Authors (5): Tulcan, Elida-Gabriela; Sticlaru, Carmen ... Lovasz, Erwin-Christian
Published: 2025 in Mechanism Design for Robotics
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Medical Disinfection Robots. A Review on Disinfection Methods
Authors (5): Tulcan, Elida-Gabriela; Sticlaru, Carmen ... Lovasz, Erwin-Christian
Published: 2025 in Mechanism Design for Robotics
DOI: 10.1007/978-3-031-80512-7_83
Accession Number: WOS:001457382100083

The Influence of Link Lengths on the Kinematic Performance of the 2R Serial Robot
Authors (4): Oarcea, Alexandru; Tulcan, Elida-Gabriela ... Maniu, Inocentiu
Published: 2025 in Mechanism Design for Robotics
DOI: 10.1007/978-3-031-87537-3_12
Accession Number: WOS:001512809900012

Inverted Cardan-Gear Spring Mechanism Used for Balancing the Wheelchair Backrest and Footrest
Authors (6): Popescu, Ioan-Emil; Florescu, Florin ... Lovasz, Erwin-Christian
Published: 2025 in Mechanism Design for Robotics
DOI: 10.1007/978-3-031-87537-3_15
Accession Number: WOS:001512809900015

Feasibility Study of the Seven-Bar Linkage 7-PR(RRRR)RP Used for Medical Disinfection Robot
Authors (6): Tulcan, Elida-Gabriela; Sticlaru, Carmen ... Lovasz, Erwin-Christian
Published: Dec 2024 in Robotics
DOI: 10.3390/ROBOTICS13120177
Accession Number: WOS:001385630700001

Wrist Exoskeleton Actuated by a 2-RRU-U Parallel Manipulator
Authors (5): Craciun, Narcis-Gratian; Tulcan, Elida-Gabriela ... Lovasz, Erwin-Christian
Published: Dec 2024 in Machines
DOI: 10.3390/MACHINES12120945
Accession Number: WOS:001384618700001

Optimal Synthesis of Five-Bar Linkage Based on Singularity-Free Workspaces with Predefined Shapes
Authors (6): Lovasz, Erwin-Christian; Ciupe, Valentin ... Sandu, Melania-Olivia
Published: Dec 2024 in Robotics
DOI: 10.3390/ROBOTICS13120173
Accession Number: WOS:001384554800001

Kinematic Analysis of the 4-U(RPRGR)RU Redundant Parallel Robot
Authors (4): Oarcea, Alexandru; Tulcan, Elida-Gabriela ... Lovasz, Erwin-Christian
Published: 2024 in Mechanism Design for Robotics
DOI: 10.1007/978-3-031-67383-2_38
Accession Number: WOS:001329880600038

Wrist Exoskeleton Actuated by a Parallel Manipulator
Authors (4): Craciun, Narcis-Gratian; Tulcan, Elida Gabriela ... Lovasz, Erwin-Christian
Published: 2024 in Mechanism Design for Robotics
DOI: 10.1007/978-3-031-67383-2_19
Accession Number: WOS:001329880600019

Unitary Synthesis Method of Basic Mechanisms with Translating Driven Element
Authors (7): Lovasz, Erwin-Christian; Ceccarelli, Marco ... Buncianu, Dorel
Published: 2024 in Mechanism Design for Robotics
DOI: 10.1007/978-3-031-70251-8_2
Accession Number: WOS:001328769400002

Comparative Study of the Kinematic Performance Indices for the 3-U(RPRGR)RU and the 3-URU Parallel Robots

Authors (4): Oarcea, Alexandru; Tulcan, Elida-Gabriela ... Lovasz, Erwin-Christian
Published: 2024 in Mechanism Design for Robotics
DOI: 10.1007/978-3-031-59257-7_35
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Noncircular Cable-Pulley Mechanisms Used for Equilibrating the Wheelchair Backrest
Authors (6): Popescu, Ioan-Emil; Florescu, Florin ... Lovasz, Erwin-Christian
Published: 2024 in Mechanism Design for Robotics
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Kinematic Analysis of the Seven-Bar Linkage 7-PR(RRRR)RP Used for Medical Disinfection Robot
Authors (5): Tulcan, Elida-Gabriela; Sticlaru, Carmen ... Lovasz, Erwin-Christian
Published: 2024 in Mechanism Design for Robotics
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Analytical Synthesis of the Seven-Bar Linkage 7-PR(RRRR)RP Used for Medical Disinfection Robot
Authors (5): Tulcan, Elida-Gabriela; Oarcea, Alexandru ... Lovasz, Erwin-Christian
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Medical Disinfection Robots: Past vs Future. Improving the Disinfection Process by Using Disinfection Robots with Folding Mechanism
Authors (4): Tulcan, E.-G.; Sticlaru, C. ... Lovasz, E.-C.
Published: Jun 2023 in International Conference on Engineering of Modern Electric Systems (EMES)
DOI: 10.1109/EMES58375.2023.10171677
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Design of a Medical Robot with Folding Mechanism Used for Disinfection in the Hard-to-Reach Areas
Authors (3): Tulcan, Elida-Gabriela; Sticlaru, Carmen; Lovasz, Erwin-Christian
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Title: UNITARY KINEMATIC ANALYSIS AND SYNTHESIS OF THE SYMMETRICAL SEVEN-BAR LINKAGES FOR THE DESIGN OF MEDICAL DISINFECTION ROBOTS IN ENVIRONMENTAL APPLICATIONS
Author(s): Tulcan, EG (Tulcan, Elida-Gabriela); Sticlaru, C (Sticlaru, Carmen); Oarcea, A (Oarcea, Alexandru); Sandu, MO (Sandu, Melania Olivia); Lovasz, EC (Lovasz, Erwin-Christian)
Source: ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL **Volume:** 25 **Issue:** 2 **Pages:** 289-299 **DOI:** 10.30638/eemj.2026.023 **Published Date:** 2026 FEB
Abstract: The paper presents the type synthesis and the unitary kinematic analysis and synthesis of different configurations of the symmetrical seven-bar linkages. The type synthesis led to the development of symmetrical seven-bar linkages with both revolute and prismatic joints. From these, two configurations of seven-bar linkages were identified and studied. The purpose of the paper is, besides providing an unitary analysis and synthesis of the symmetrical seven-bar linkages, to highlight which folding mechanism structure is the most feasible for the design of a medical disinfection robot. The optimal structure should have small dimensions and provide at the same time the largest height variation of the mechanism between the minimum configuration and the maximum configuration. These aspects ensure that the robot will be able to disinfect both large environments and areas with limited space. Since currently available disinfection robots have a bulky design and cannot operate in multiple configurations, they cannot disinfect hard-to-reach areas, therefore the best way to improve the environmental disinfection is to use disinfection robots with folding mechanisms.
Accession Number: WOS:001784389100004
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Addresses: [Tulcan, Elida-Gabriela; Sticlaru, Carmen; Oarcea, Alexandru; Sandu, Melania Olivia; Lovasz, Erwin-Christian] Politehn Univ Timisoara, Timisoara 300006, Romania.
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Record 1 of 1

Title: OPTIMAL SYNTHESIS OF THE FIVE-BAR LINKAGES WITH SYMMETRICAL STRUCTURE BY USING IMPOSED TRAJECTORIES FOR HOME TRAINING

Author(s): Demjen, T (Demjen, Tivadar); Oarcea, A (Oarcea, Alexandru); Tulcan, EG (Tulcan, Elida-Gabriela); Lovasz, EC (Lovasz, Erwin-Christian); Silaghi-Perju, DC (Silaghi-Perju, Dan Cristian); Maries, L (Maries, Liana)

Source: ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL **Volume:** 25 **Issue:** 2 **Pages:** 257-263 **DOI:** 10.30638/eemj.2026.020 **Published Date:** 2026 FEB

Abstract: The five-bar mechanism is widely recognized for its high precision, structural rigidity, and versatility, being extensively applied in robotics, medical rehabilitation, agricultural machinery, and automated sampling systems, including emerging uses in environmental monitoring. Post-stroke rehabilitation of the limbs requires equipment with controlled-constraint movement. The paper proposes a rehabilitation system for the upper limb, which is usable in medical facilities but also in home training, based on a five-bar linkage structure. The synthesis method allows the analytical computation of the links length of a symmetrical five-bar linkage in order to avoid the singularities in an imposed dexterous trajectory. The type synthesis of the five-bar linkage shows that the number of symmetrical structures of five-bar linkage is limited to 8 structures, from which the structure 5-RRRRR, 5-RTRTR and 5-TRRRT are application relevant. This study shows the optimization of the novel synthesis method by considering a maximal minimum transmission angle and a maximal manipulability along an imposed trajectory. The minimum transmission angle and the manipulability index value of a linkage can be directly linked to the kinematic performance of a robotic structure and, since the five-bar linkage is widely used in rehabilitation and training devices, the proposed synthesis method will further contribute to the development of experimental devices.

Accession Number: WOS:001784389100001

Document Type: Article

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Mechanisms and Machine Science, 2025, 179, pp. 190–199

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Mechanisms and Machine Science, 2025, 179, pp. 200–207

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Tulcan, Elida Gabriela,Oarcea, Alexandru,Sticlaru, Carmen,Ceccarelli, Marco M.,Lovasz, Erwin Christian

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Mechanisms and Machine Science, 2024, 154, pp. 61–72

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Mechanisms and Machine Science, 2024, 154, pp. 51–59

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Citations

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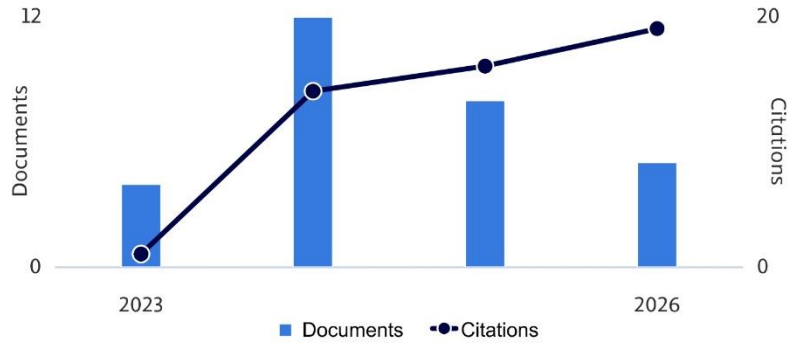
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