Daniel Condurache

Date of birth: 15/08/1955

Nationality: Romanian

CONTACT

Bulevardul Profesor Dimitrie Mangeron, nr. 67
700050 Iași, Romania

daniel.condurache@gmail.com

(+40) 232242109

(+40) 744615285

http://www.ac.tuiasi.ro/~dcondurache/

WORK EXPERIENCE

2012 – 2020
Vice-rector
"Gheorghe Asachi" Technical University of Iaşi, Romania
Informatization and digital communications

2005 – 2012
Head of Department
"Gheorghe Asachi" Technical University of Iaşi, Romania, Department of Theoretical Mechanics

2001 – CURRENT
Professor (Emeritus 2022)
"Gheorghe Asachi" Technical University of Iaşi, Romania, Department of Theoretical Mechanics

1996 – 2001
Associate professor
"Gheorghe Asachi" Technical University of Iaşi, Romania, Department of Theoretical Mechanics

1990 – 1996
Lecturer
"Gheorghe Asachi" Technical University of Iaşi, Romania, Department of Theoretical Mechanics

1984 – 1990
Assistant Professor
Polytechnic Institute of Iași, Department of Theoretical Mechanics

EDUCATION AND TRAINING

1990 – 1995
PhD. Mechanical Engineering (Magna Cum Laude)
"Gheorghe Asachi" Technical University of Iaşi (Romania)
ISCED 4

1980 – 1985
Teacher of Mathematics
„Alexandru Ioan Cuza" University of Iaşi, Romania, Faculty of Mathematics
ISCED 4

1975 – 1980

- **Engineer**
  Polytechnic Institute of Iași (Faculty of Electronics and Telecommunications)
  ISCED 4

LANGUAGE SKILLS

MOTHER TONGUE(S): Romanian

OTHER LANGUAGE(S):

English

Listening	Reading	Spoken production	Spoken interaction	Writing
B2	C1	B1	B2	B1

French

Listening	Reading	Spoken production	Spoken interaction	Writing
C2	C2	C1	C1	C1

NETWORKS AND MEMBERSHIPS

- **Memberships**

  Senior Member AIAA (American Institute of Aeronautics and Astronautics) ID 268679

  Senior Member IEEE (The Institute of Electrical and Electronics Engineers-USA) ID 80605322

  Senior Member IEEE Robotics and Automation Society ID 80605322

  Senior Member IEEE Aerospace and Electronic Systems Society ID 80605322

  Member AAS (American Astronautical Society) ID 12690

  Member ASME (American Society of Mechanical Engineering) ID 9012220

  Member AMS (American Mathematical Society USA) code CNDCXK

  Founding member of Romanian Society of Theoretical and Applied Mechanics

  Corresponding member of the Academy of Technical Sciences in Romania

  Corresponding member of the Romanian Academy

  Member The New York Academy of Science ID 11012654

JOB-RELATED SKILLS

Job-related skills

- Algebraic and geometric methods in dynamic systems
- Astrodynamics, Satellites formation flying
- Orbital mechanics
- Integral transformations on hypercomplex spaces, wavelets analysis
- Lie group and Lie algebra in Robot computational kinematics and dynamics

- CNATDCU member - Mechanical Engineering, Mechatronics, and Robotics
- CCCDI member-Ministry of Research, Innovation, and Digitalization
- Ph.D. supervisor (Mechanical Engineering)

- Courses taught: Theoretical Mechanics, Technical Mechanics, Modeling and Simulation of Mechanical Systems, Mathematical Foundations of Robotics.

OTHER SKILLS

Other skills

1999 - present - Editor of the weekly newspaper *Opinia studenţească* (both print and online)

Coordinator of the news agency *Cuzanet (part of the Alexandru Ioan Cuza University)* Courses taught: *Tehnici şi tehnologii media, Multimedia* şi *Canale media*, Departament of Journalism and Communication Sciences, Faculty of Letters, "Al. I. Cuza" University of Iaşi

Author of over 300 articles (news, reportages, interviews, investigations etc.) published in *Viaţa Studenţească*, *Opinia studenţească*, *Europa Liberă*, *BBC*, *Expres Magazin*, *Evenimentul Zilei*

1996-1999 - general manager of the newspaper network *Monitorul*

1993-1996 - deputy editor *Evenimentul Zilei* 1992-1993 - department head *Evenimentul Zilei* 1992-1996 - department head *Expres Magazin* 1990-1992 - reporter *Europa Liberă*

1989-1992 - editor *Opinia studenţească*

1982-1989 - deputy editor *Opinia studenţească*

1975-1980 - deputy editor *Opinia studenţească*

1974-1980 - deputy chief *Viaţa Studenţească*

Founding member of Association of Journalists from Romania

Honorary president of Association of Professional Journalists from Iasi

Member in the board of Center for Independent Journalism

Rotary International Public Image Coordinator - Evanston USA 2010-2014

District Governor Rotary International from Romania and Republic of Moldova 2009-2010

COD RESEARCHER

- **Cod Researcher**
  ID: B-7153-2011 6
  H index 12
  https://publons.com/researcher/1423702/daniel-condurache/

SCOPUS AUTOR

- **Scopus autor**
  ID: 15841500000
  H index 13
  https://www.scopus.com/authid/detail.uri?authorId=15841500000

ORCID

- **ORCID**
  ID: orcid.org/0000-0001-9287-8387
  https://orcid.org/0000-0001-9287-8387

BOOKS AND CHAPTERS

Books and Chapters

Burlacu Adrian, **Condurache Daniel,** Corneliu Lazăr, *Motion Parameterization, and Control: Advances and Applicatio*ns**,** MATRIX ROM, 2021, ISBN 978-606-25-0653-7

Condurache D., *Singularity-Free Extraction of a Dual Quaternion from Orthogonal Dual Tensor*. Springer Proceedings in Advanced Robotics, vol 15. 2021, Springer, Cham. https://doi.org/10.1007/978-3-030-50975-0_18, ISBN 978-3-030-50974-3.

Condurache D., *Multidual Algebra and Higher-Order Kinematics*. New Trends in Mechanism and Machine Science. EuCoMeS 2020. Mechanisms and Machine Science, vol 89, 2020, Springer, Cham. https://doi.org/10.1007/978-3-030-55061-5_7, ISBN 978-3-030-55060-8

Condurache D. The Full-Body Kepler's Problem in a Non-Inertial Reference Frame. A Dual Lie Algebra Approach**,** AAS 20-660**,** July 2020, In book: Advances in the Astronautical Sciences, Edition: Vol 175, 2021, Chapter: AAS 20-660, Publisher: Univelt, Incorporated, P.O. Box 28130, San Diego, California 92198

Condurache D., *Higher-Order Kinematics of Rigid Bodies. A Tensors Algebra Approach, In*: Kecskeméthy A., Geu Flores F., Carrera E., Elias D. (eds) Interdisciplinary Applications of Kinematics. Mechanisms and Machine Science, vol 71. Springer, Cham, 2019, ISBN 978-3-030-16422-5

Condurache D., *Higher-Order Relative Kinematics of Rigid Body Motions: A Dual Lie Algebra Approach*, Advances in Robot Kinematics 2018. ARK 2018, Lenarcic J., Parenti-Castelli V. (eds), Vol 8. pg. 83-91, Springer Proceedings in Advanced Robotics, June 2018, ISBN 978-3-319-93188-3.

Condurache D., *On Six DOF Relative Orbital Motion of Satellites*, Space Flight, Pag. 78-100, June 20th, 2018, INTECH, ISBN: 978-1-78923-283-7.

Condurache, D., Ciureanu, I.-A.**,** *Higher-order Cayley transforms for SE (3),* Mechanisms and Machine Science, Volume 57, 2018, Pages 331-339, ISBN: 978-3-319-79110-4.

Condurache D., Burlacu A., Recovering a *Dual Euler Parameters from Feature-Based Representation of Motion*, Advances in Robot Kinematics, Jadran Lenarcic and Ousama Khatib (Eds), pp.295-305, Springer International, 2014, ISBN: 978-3-319-06697.

Condurache D., *Spacecraft Relative Orbital Motion*, Advances in Spacecraft Systems and Orbit Determination, Dr. Rushi Ghadawala (Ed.), Intech, 2012, ISBN: 978-953-51-0380-6.

Condurache D., *A New General investigation of the Kinematics of the Rigid Bodies*, Polirom, 2010, ISBN 973-9476-21-X

Condurache Daniel, *Capitole speciale de mecanică teoretică*_ – Iași : Polirom, 2010. ISBN: 973-9476-22-8

Condurache D., *Reprezentări simbolice. Aplicații în teoria semnalelor şi st udiul sistemelor dinamice (Symbolic Representations. Applications in Signal Theory and Dynamical Systems)*, Nord-Est, Iași, 1996, ISBN 973-97101-8-2.

Condurache, D., Matcovschi M. H., *Fundamentele matematice ale mecanicii roboților (Mathematical Fundamentals of Robot Mechanics),* 2000

PUBLISHED RESEARCH ARTICLES

Published research articles

Over 100 articles published in research databases and ISI web of knowledge

ISI articles (selection)

Condurache, D.; Ciureanu, I.-A. *Baker–Campbell–Hausdorff–Dynkin Formula for the Lie Algebra of Rigid Body Displacements*. *Mathematics* 2020, *8*, 1185.

Condurache D., *A Davenport dual angles approach for minimal parameterization of the rigid body displacement and motion*, **Mechanism and Machine Theory,** vol. 140, 2019, pp 104-122.

Condurache D., *A MINIMAL PARAMETERIZATION ON SIX D.O.F. RELATIVE ORBITAL MOTION PROBLEM USING DUAL LIE ALGEBRA*, **Advances in the Astronautical Sciences**, Volume 167, 2019, pp. 783-800.

Condurache D., Burlacu A., *Fractional Order Cayley Transforms for Dual Quaternions based Pose Representation*, **Advances in the Astronautical Sciences**, Vol.165, 2016, pp. 1317-1339.

Condurache D., Burlacu A., *Onboard Exact Solution to the Full-Body Relative Orbital Motion Problem,* AIAA **Journal of Guidance, Control, and Dynamics**, Vol. 39, no.12, 2016, pp. 2638-2648.

Condurache D., Burlacu A., *Orthogonal dual tensor method for solving the AX = XB sensor calibration problem,* **Mechanism and Machine Theory**, Vol 104, 2016, pp. 382-404.

Condurache D., Burlacu A., Dual Tensors based Solutions for Rigid Body Motion Parameterization, **Mechanism and Machine Theory**, Vol. 74, 2014, pp. 390-412.

Condurache, D.; Martinusi, V., *Quaternionic Exact Solution to the Relative Orbital Motion Problem*, **AIAA Journal of Guidance, Control, and Dynamics**, Vol. 33, no. 4, 2010, pp. 1035-1047.

Condurache, D., Martinusi, V., *Hypercomplex Eccentric Anomaly in the Unified Solution to the Relative Orbital Motion*, **Advances in the Astronautical Sciences**, Vol. 135, 2010, pp. 281-300. (AAS 09-321).

Condurache, D., Martinusi, V., *Exact Solution to the Relative Orbital Motion in Eccentric Orbits*, **Solar System Research**, Volume 43, Issue 1, 2009, pp. 41-52.

Condurache, D., Martinusi, V., *TOChNOEREShENIEZADAChI OTNOSITEL'NOGO ORBITAL'NOGO DVIZhENIYa PO EKSTsENTRIChESKOI ORBITE*, **Astronomicheskii Vestnik/Astronomy Review**, Vol. 43, No. 1, 2009, pp. 44–55.

Condurache D., Martinusi, V., *Foucault Pendulum-like problems: A Tensorial Approach*, **International Journal of Non-linear Mechanics**, vol. 43, issue 8, 2008, pp. 743-760.

Condurache D., Martinusi, V., *A Complete Closed Form Solution to the Kepler Problem*, **Meccanica**, Vol. 42, no.5, 2007, pp. 465-476.

Condurache D., Martinusi, V., *Relative Spacecraft Motion in a Central Force Field*, **AIAA Journal of Guidance, Control, and Dynamics**, vol. 30, no. 3, 2007, pp. 873-876.

Condurache D., Martinusi, V., *Kepler's Problem in Rotating Reference Frames. Part I : Prime Integrals, Vectorial Regularization*, **AIAA Journal of Guidance, Control and Dynamics**, Vol. 30, no. 1, 2007, pp. 192-200.

Condurache D., Martinusi, V., *Kepler's Problem in Rotating Reference Frames. Part II: Relative Orbital Motion*, **AIAA Journal of Guidance, Control and Dynamics**, Vol. 30, no. 1, 2007, pp. 201-213.

ARTICLES - INTERNATIONAL CONFERENCES PROCEEDINGS (SELECTION)

Articles - international conferences proceedings (selection)

Condurache D., *SINGULARITY-FREE EXTRACTION OF A DUAL QUATERNION FROM FEATURE-BASED REPRESENTATION OF MOTION* , **AAS/AIAA Astrodynamics Specialist Conference ,**11 - 15 August, 2019, Portland, USA

Condurache D., *Closed Form of the Baker-Campbell-Hausdorff Formuła for the Lie Algebra of Rigid Body Displacements*, **ECCOMAS Multibody Dynamics Conference** ,15th - 18th July 2019, Duisburg, Germany

Condurache D., *A novel solution for AX=YB sensor calibration problem using dual Lie algebra*, **6th International Conference on Control, Decision and Information Technologies (CODIT'19)**, April 2019, Paris, France

Condurache D., *Higher-Order Cayley Transform For Relative Pose Parameterization Of Spacecraft*, **69-th International Astronautical Congress 2018**, Oct. 2018, Bremen, Germany.

Condurache D., *A Minimal Parameterization On Six D.O.F. Relative Orbital Motion Problem Using Dual Lie Algebra*, **AAS/AIAA Astrodynamics Specialist Conference** – Snowbird, August 19 – 23, 2018, UT, USA.

Condurache D., *Higher–order Rodrigues dual vectors. Kinematic equations and tangent operator*, **The 5th Joint International Conference on Multibody System Dynamics**, June 24 – 28, 2018, Lisbon, Portugal.

Condurache D., *Higher-Order Kinematics Of Rigid Bodies. A Tensors Algebra Approach*, **IAK 2018 – Third Conference on Interdisciplinary Applications in Kinematics**, March 5-7, 2018, Lima, Peru.

Condurache D., *On Board Complete Solution to the Full- Body Relative Orbital Motion Problem*, **68th International Astronautical Congress**, 25–29 September, 2017, Adelaide, Australia.

Condurache D., *Poisson-Darboux Problem's Extended in Dual Lie Algebra*, **AAS/AIAA Astrodynamics Specialist Conference**, August, 20-24, 2017, Columbia River Gorge, Stevenson, WA, USA.

Condurache D., Burlacu A., *General rigid body motion parameterization using modified Cayley transform for dual tensors and dual quaternions***, T he 4th Joint International Conference on Multibody System Dynamics**, May 29 - June 2, 2016, Montreal, Canada.

Condurache D., *Relative Orbital Motion Analysis using Dual Lie Algebra Representation*, **66th International Astronautical Congress (IAC)** 2015: Space - The Gateway for Mankind's Future, IAC 2015; Jerusalem; Israel; 12 October 2015-16 October 2015; Code 122921, pp. 6097-6100.

Condurache D., Burlacu A., *On Board Exact Solution to the Full Body Relative Orbital Motion Problem*, **AIAA Space and Astronautics Forum and Exposition: AIAA/AAS Astrodynamics Specialist Conference**, 4-7 August 2014, San Diego, USA.

Condurache D., Burlacu A., *On Six D.O.F Relative Orbital Motion Parameterization using Rigid Bases of Dual Vectors*, **AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, South Carolina, August 11-15, 2013.**

Condurache, D., Burlacu A., *Rigid Body Pose Estimation using Dual Quaternions Computed from Direct Measurements*, **43rd International Symposium on Robotics, May 29-31,Taiwan, Taipei, 2012.**

RESEARCH GRANTS (SELECTION)

Research grants (selection)

2021: Principal Investigator POC/398/1/1-Cod SMIS 2014+124998

2019: Principal Investigator CNFIS-FDI- 2019-0273 "CONNECT@TUIASI: Infrastructura Wireless Smart Campus pentru susținerea procesului didactic și de cercetare si asigurarea securității cibernetice a comunicațiilor

2018-2019: Principal Investigator CNFIS-FDI-2018-0570 WIRELESS-CAMPUS: Extinderea infrastructurii wireless Smart Campus pentru susținerea activităților didactice și de cercetare

2018: CNFIS-FDI-2018-0006 Acces Direct prin Internaționalizarea Digitală- DIGITAL in TUIAȘI

2018: CNFIS-FDI-2018-0351 Instrumente pentru susținerea cercetării de excelență la TUIASI-Expert

2017-2018: Principal Investigator CNFIS-FDI-2016-0047 Implementarea Registrului Matricol Unic în Universitatea Tehnică "Gheorghe Asachi" din Iasi – RMU-TUIASI

2015-2016: CNFIS-FDI-2016-0047 Implementarea Registrului Matricol Unic în Universitatea Tehnică "Gheorghe Asachi" din Iasi – RMU-TUIASI

2014: PROIECT COMMIT-Expert

2014-2015:POSDRU/155/1.2/S/141884 ACAD-INOV "Comunitate virtuală pentru asigurarea calității și perfecționării managementului strategic și inovativ în universitățile tehnice și compozite, în vederea creșterii relevanței învățământului superior pentru piața muncii"

2007-2009: Principal Investigator: *Exact solutions in relative orbital dynamics. Applications in formation flying spacecraft guidance and control* (CNCSIS code 200).

2006: *Susținerea integrării cercetării românești în domeniul poluării electromagnetice în rețele, programe și parteneriate europene de profil (Supporting the Integration of Romanian Research in Electromagnetic Pollution in European networks, programs and partnerships)*, CEEX 2006.

- **1998-2002**: **Director de proiect**: Noi modele pentru medii continuu deformabile și aplicații la interacțiunea dintre mediile compozite, granulare, viscoelastice și structura, (CNCSIS code 8, Grant tip 4C — Banca Mondială și Guvernul României, number 46769/1998).
- **1996**: Metode numerice de identificare și optimizare în studiul sistemelor dinamice.
- Faza 50.1: Studierea, determinarea și optimizarea parametrilor constructivi și funcționali ai unor sisteme mecanice și caracteristici ale structurilor (Contract nr. 5002/1996, Tema 50/ Grant 498).
- **1994-1996**: Studiul vibrațiilor sistemelor mecanice cu aplicații în construcția de mașini.
- Faza de execuție: Condițiile de apariție a efectelor oscilațiilor neliniare în funcționarea mașinilor (Contract nr. 5002, Grant nr. 497, Tema nr. 49, 1996).
- Faza III: Modelarea matematică a fenomenelor specifice de vibrații neliniare ce intervin în diverse clase de mașini (Contract nr. 4002, Tema A23, grant nr. 761, 1995).
- Faza II: Aspecte noi în teoria modelării, identificării și optimizării sistemelor mecanice și structurilor (Contract nr. 4002/1995, Tema B22, grant nr. 765, 1995).
- Faza I: Studiu monografic și cercetări preliminare privind vibrațiile în construcția de mașini (Contract nr. 4002, Tema A23, grant nr. 761, 1994).

CONFERENCES (SELECTION)

Conferences (selection)

Relative Orbital Motion Analysis Using Dual Lie Algebra Representations, 66th International Astronautical Congress 2015, Astrodynamics Symposium, 12-16 October 2015, Jerusalem, Israel.

Fractional Order Cayley Transforms For Dual Quaternions Based Pose Representation, AAS/AIAA Astrodynamics Specialist Conference, 9-13 August 2015, Vail, Colorado, USA.

On Board Exact Solution to the Full Body Relative Orbital Motion Problem, AIAA Space and Astronautics Forum and Exposition: AIAA/AAS Astrodynamics Specialist Conference, 4-7 August 2014, San Diego, USA.

Dual Lie Algebra Representations of the Rigid Body Motion, AIAA Space and Astronautics Forum and Exposition: AIAA/AAS Astrodynamics Specialist Conference, 4-7 August 2014, San Diego, USA.

Recovering Dual Euler Parameters from Feature-Based Representation of Motion, 14th Int. Symposium on Advances in Robot Kinematics, June 29 – July 3, 2014, Ljubljana, Slovenia.

Analytical Orbit Propagator Based on Vectorial Orbital Elements, AIAA Guidance, Navigation and Control Conference, 19-21 August 2013, Boston, MA, USA. Paper AIAA-2013-5188.

On Six D.O.F Relative Orbital Motion Parametrization using Rigid Bases of Dual Vectors, AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, South Carolina, USA, August 11-15, 2013.

Rigid Body Pose Estimation using Dual Quaternions Computed from Direct Measurements, 43rd International Symposium on Robotics, 29-31 May, Taiwan, Taipei, 2012.

Super-integrability in the unperturbed relative orbital motion problem, AIAA/AAS Astrodynamics Specialist Conference, Toronto, Canada, 2-5 August 2010.

Analytic Solution to the Relative Orbital Motion Around an Oblate Planet, AIAA Guidance, Navigation and Control Conference and Exhibit, Chicago, Illinois, USA, 10-13 Aug. 2009.

Hypercomplex Eccentric Anomaly in the Unified Solution to the Relative Orbital Motion; AAS/AIAA Astrodynamics Specialist Conference, Pittsburgh, Pennsylvania, USA, August 2009 (paper AAS-09-321).

Analytic Solution to the Relative Orbital Motion Around an Oblate Planet; AIAA Guidance, Navigation and Control Conference and Exhibit, Chicago, Illinois, August 2009 (paper AIAA 2009-6098).

Exact Solutions in Relative Orbital Dynamics; 3rd International Conference on Computational mechanics and virtual engineering, COMEC, Brasov, October 2009.

A Quaternionic Exact Solution to the Relative Orbital Motion, AIAA/AAS; Astrodynamics Specialist Conference and Exhibit, Honolulu, Hawaii, 18-21 August 2008, AIAA Paper 2008-6764.

Exact Solution to the Relative Orbital Motion in a Central Force Field; The 2nd IEEE/AIAA International Symposium on Systems and Control in Aeronautics and Astronautics, Shenzhen, China, 10-12 December 2008.

Exact Solution to the Relative Orbital Motion in Eccentric Orbits; International Conference "Analytical Methods of Celestial Mechanics", Sankt-Petersburg, Russia, July 2007.

A Novel Hypercomplex Solution to Kepler's Problem, PADEU, Astronomy Department. of the Eötvös University,19, June 2007.

SCIENTIFIC ADVISOR

Scientific advisor

Acta Astronautica

Advances in Applied Clifford Algebras

Advances in Space Research

Aerospace Science and Technology

Antimicrobial Agents and Chemotherapy

Astrophysics and Space Science

Celestial Mechanics and Dynamical Astronomy

Heliyon

IEEE Robotics & Automation Letters

Information and Computation

International Journal of Non-linear Mechanics

Journal of Guidance, Control, and Dynamics

Journal of Mechanical Design

Journal of the Franklin Institute

Mathematical Methods in the Applied Sciences

Mathematical Problems in Engineering

Mathematics

Meccanica

Measurement

Mechanical Sciences

Mechanism and Machine Theory

Oyo rikigaku ronbunshu

Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences

Robotica

Symmetry

Physics

The Journal of the Astronautical Sciences

International Advisory Committee

Bulletin of the Polytechnic Institute of Iași ISSN 1223-8139

Editor in Chief

ROMANIAN JOURNAL OF TECHNICAL SCIENCES - APPLIED MECHANICS ISSN 2601-5811

International Advisory Committee

Parana Journal of Science and Education (PJSE), ISSN 2447-6153

Member of the editorial team

Romanian Journal of Mechanics ISSN 2537 -5229

Editorial board member

Mechanical Sciences ISSN 2191-9151

Topical editor for Robotics, Dynamics, and Control

HONOURS AND AWARDS

- **Honours and awards**
  Academy of Technical Sciences in Romania Award "Constantin C. Teodorescu"- 22 October 2021

  Romanian Academy Award "Traian Vuia" -12 December 2019

  Doctor Honoris Causa of „Dunărea de Jos" University of Galați, 14 October 2016

  Honorary citizen of Iași town - 14 October 2014

  Winner of the Romanian Press Club Gala - *2003*, for best editorial project

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Iasi, 14/01/2023

Daniel Condurache