

1. Record Nr.	UNINA9910770265003321
Autore	Ceccarelli Marco
Titolo	State-Of-the-Art and Innovations in Mechanism and Machine Science : A Tribute to Carlos López-Cajún
Pubbl/distr/stampa	Cham : , : Springer, , 2024 ©2024
ISBN	3-031-47040-0
Edizione	[1st ed.]
Descrizione fisica	1 online resource (313 pages)
Collana	Mechanisms and Machine Science Series ; ; v.150
Altri autori (Persone)	Jauregui-CorreaJuan Carlos
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Preface -- Contents -- 1 Carlos López-Cajún: IFToMMist MMS Scientist -- 1.1 Biographical Notes -- 1.2 IFToMMist Figure -- 1.3 MMS Scientist -- 1.4 Conclusions -- References -- 2 First in Memoriam Seminar for Carlos Lopez Cajun (Summary of Presentations) -- 2.1 Introduction -- 2.2 Juan Primo Benitez-Rangel and Wenceslao Ortiz-Vargas -- 2.2.1 Summary -- 2.2.2 Introduction -- 2.2.3 His Beginning -- 2.2.4 Professional Environment -- 2.2.5 Sabbatical Year -- 2.2.6 Didactic Changes -- 2.3 Aurelio Dominguez-Gonzalez -- 2.3.1 A Little History with Dr. López Cajún -- 2.4 Alejandro Lozano-Guzmán -- 3 A Note on the History of the Science of Machines -- 3.1 Introduction -- 3.2 Simple Machines 1: Mechanical Problems -- 3.3 Simple Machines 2: Heron of Alexandria -- 3.4 Simple Machines 3: Galilei -- 3.5 Simple Machines 4: The Encyclopedists -- 3.6 Kinematics 1: Leupold -- 3.7 Kinematics 2: Lazare Carnot -- 3.8 Kinematics 3: Gaspard Monge -- 3.9 Kinematics 4: Robert Willis -- 3.10 Kinematics 5: Franz Reuleaux -- 3.11 Dynamics, Concluding Remarks -- References -- 4 Motion Synthesis: From the Classical Work of Reuleaux to the More Modern Robot Motion Planning -- 4.1 Introduction -- 4.2 Reuleaux's Method -- 4.3 Kinematic Mapping Methods -- 4.4 Riemannian Manifolds and Lie Groups -- 4.5 Conclusions -- References -- 5 Betancourt's Contribution to Path Generation Synthesis in Mechanisms -- 5.1 Introduction -- 5.2 The Mémoire Sur Une Machine À Vapeur À Double Effect -- 5.3 The "Essai Sur La Composition Des Machines" -- 5.4

Conclusions -- References -- 6 A Brief History of Robotics
Development of CAS -- 6.1 The Initial Period (1975-1985) -- 6.2 The Growth Period (1986-2005) -- 6.3 The Rapid Development Period (2006-2020) -- 6.4 Conclusion -- References -- 7 Education in Mechanism and Machine Science -- 7.1 Introduction -- 7.2 MMS Contents.
7.2.1 Introduction to Mechanism and Machine Science -- 7.2.2 Engineering Mechanics Fundamentals -- 7.2.3 Kinematics of Mechanisms -- 7.2.4 Dynamics of Machinery -- 7.2.5 Machine Elements -- 7.2.6 Advanced MMS -- 7.3 MMS Teaching -- 7.4 Talent Attraction to MMS and New Prospectives -- 7.5 Conclusions -- References -- 8 Cam Mechanisms in the MMS Study Course -- 8.1 Introduction -- 8.2 Aspects of Active Learning in Section Cams in the MMS Study Course -- 8.3 Cams by Students' Eyes -- 8.4 Cams in Student Olympiads on MMS -- 8.5 Conclusion -- References -- 9 Examples of a Learning-By-Doing Approach for Bachelor and Master Students Approaching Robot Design -- 9.1 Introduction -- 9.2 Learning by Doing Concepts -- 9.3 The Proposed Robot Design Learning Approach -- 9.4 The Need of Optimal Design Criteria -- 9.5 Exemplificative Case Studies -- 9.5.1 The RobotSumo Competition for Bachelor Students -- 9.5.2 Examples of Mechatronics' Group Projects at Master Level -- 9.6 Conclusions -- References -- 10 Innovations in Design of Worm-type Gears in the Last Two Decades -- 10.1 Introduction -- 10.2 The Main Object of Development-spiroid Gear -- 10.3 Special Case-Low-Speed Spiroid Gears -- 10.4 "Unexpected" Design Rules -- 10.5 Another Special Case-Spiroid Gears with Small Gear Ratios -- 10.6 Steel-Steel Worm Gears -- 10.7 Planetary Worm and Spiroid Gear -- 10.8 Conclusion -- References -- 11 Design of Gear Pump of Electro-Hydrostatic Actuator for Robots -- 11.1 Introduction -- 11.2 Difference Between EHA and Conventional Geared Motor -- 11.2.1 Backdrivability -- 11.2.2 Size and Weight -- 11.2.3 Internal Leakage -- 11.3 Development of a Pump for Robotic EHA -- 11.3.1 Types of a Pump -- 11.3.2 Design of Internal Clearances of a Gear Pump -- 11.3.3 Design of Gear Side Clearance -- 11.3.4 Design of Gear Tip Clearance -- 11.4 Conclusion -- References.
12 Overview of Special Wire Mechanisms Used for Self-balancing Mechanisms -- 12.1 Introduction: State-of-Art -- 12.2 Special Self-balancing Wire Mechanisms -- 12.2.1 Principle of Force Equilibrium -- 12.2.2 Self-balancing of a Measurement Head -- 12.2.3 Force Equilibrium in a Constant Pressure Chamber -- 12.2.4 Force Equilibrium of a Bistable Type Mechanism -- 12.2.5 Force Equilibrium by Self-balancing Conco-Balancer Manipulator -- 12.3 Scientific Contributions -- References -- 13 Design of a Five DOF Contactless Robot for Facade Inspection -- 13.1 Introduction -- 13.2 Inspection Task for Building Facades -- 13.3 Conceptual Design of the Proposal -- 13.4 Forward and Inverse Kinematics -- 13.5 Detailed Robot Design -- 13.6 Construction of a Laboratory Prototype -- 13.7 Conclusions -- References -- 14 Motion Planning of Humanoid Robots Walking in Any Direction on Plane Surfaces with Arbitrary Orientation -- 14.1 Introduction -- 14.2 Position Analysis of the Legs of a Humanoid -- 14.2.1 Inverse Kinematics -- 14.3 Gait of a Humanoid Based on Cycloidal Motions -- 14.4 Sloping Surface for Walking -- 14.5 Inverse Kinematics of Velocity and Acceleration -- 14.6 Analysis of a Walking of the Bioloid Robot on a Sloping Surface Using Cycloidal Functions -- 14.6.1 Stability Index -- 14.7 Conclusion -- Appendix A. Time Cycloidal Functions for Motion of Pelvis and Free Foot -- Appendix B. Inertial Properties of Links of the Bioloid Robot -- References -- 15 A Cable-Based Quadrotor Test Bench: Preliminary

Results -- 15.1 Introduction -- 15.2 Physical Foundations for Test Bench Design -- 15.2.1 Quadrotor Dynamics -- 15.2.2 Rotor and Aerodynamic Characteristics -- 15.3 System Overview -- 15.3.1 Structure of the Test Bench -- 15.3.2 Hardware and Software Implementation -- 15.4 Preliminary Experimental Results -- 15.5 Conclusions and Future Work -- References.

16 Synchronization in Mechanical Systems -- 16.1 Introduction -- 16.2 Overview -- 16.3 Models of Analysis -- 16.3.1 Spectral Analysis -- 16.3.2 Correlation -- 16.3.3 Spectrograms -- 16.3.4 Kuramoto's Parameter -- 16.4 Recent Publications -- References -- 17 Designer's Perspective on Applying Mechanisms for Biomechanics Solutions: Unlocking the Future of Healthcare -- 17.1 Introduction -- 17.2 Design Requirement -- 17.2.1 Case I. Portable Mechanical Ventilator Design for Patients with COVID-19 -- 17.2.2 Case II. Design of a Multi-actuator Testbed to Assess Spinal Vertebrae Samples -- 17.2.3 Case III. Analysis of an Embedded Child Restraint System for Groups I, II, and III in a Vehicle -- 17.3 Overview -- 17.3.1 Results Case I -- 17.3.2 Results Case II -- 17.3.3 Results Case III -- 17.4 Conclusion -- References -- 18 REST: A REMote Skeleton Telerehabilitation System -- 18.1 Introduction -- 18.2 Proposed Telerehabilitation System -- 18.3 Implementation and Testing -- 18.4 Conclusions -- References -- 19 Design of Single/Mixed Chemistry eVTOL Battery Packs -- 19.1 Introduction -- 19.2 eVTOL Industry Survey -- 19.3 Mixed Chemistry Pack Design -- 19.4 Simulation Tool Development -- 19.5 Application to eVTOL Design #2 -- 19.5.1 Energy Cell-Only Design -- 19.5.2 Power Cell-Only Design -- 19.5.3 Mixed Chemistry Design -- 19.6 Summary -- References -- Index.
