2022 16th International Conference on Stability and Oscillations of **Nonlinear Control Systems** (Pyatnitskiy's Conference) (STAB 2022)

Moscow, Russia 1 - 3 June 2022



IEEE Catalog Number: CFP22E79-POD ISBN:

978-1-6654-6587-8

Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP22E79-POD

 ISBN (Print-On-Demand):
 978-1-6654-6587-8

 ISBN (Online):
 978-1-6654-6586-1

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400

Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



Table of Contents

Pg.	Authors	Title
1	Agaev R., Khomutov D.	On the Asymptotic Behavior of a Multiagent Systems with Arbitrary Structure and Time-Delays
4	Aleksandrov A.	On the Stability of Linear Mechanical Systems with Delay under Synchronous and Asynchronous Switching of Positional Forces
8	Aleksandrov A., Tikhonov A.	On the Use of a PID–like Controller for Electrodynamic Stabilization of the Programmed Satellite Rotation
12	Alexandrov V.	Pole Placement Optimization for Disturbance Rejection in Discrete-Time Systems
16	Alexandrov V., Rezkov I.	Linear-Quadratic Regulator for Quadcopter Altitude with Control Filtering
19	Ananievski I.	Control of a Mechanical System under Mixed Constraints in the Presence of Disturbances
21	Ananyev B., Yurovskikh P.	Averaged Estimation of the System Flock with Uncertainty
25	Andrianova O., Chairez I., Poznyak A., Hernandez Sanchez A., Mireles C., Chertopolokhov V., Bugriy G.	Adaptive Control of Robotic Arm-Based Motion Cueing System Considering Phase Restrictions
29	Antipov A., Krasnova S.	Using of Sigmoid Functions in the Control System of the Overhead Crane
33	Arutyunov A., Zhukovskaya Z., Zhukovskiy S.	On the Existence of Admissible Positional Controls for Systems with Mixed Constraints
36	Barabanov I., Tkhai V.	An Attracting Cycle in Coupled Conservative Systems with Different-Type Periodic Motions
40	Barseghyan V.	On Problems of Boundary Control of String Vibrations with Conditions on the State Functions at Given Intermediate Time Moments
44	Barseghyan V., Solodusha S.	On Optimal Boundary Control of String Vibrations with Intermediate Constraints
48	Belichenko M.	On the Stability of Equilibrium Positions of a Rigid Body with a Suspension Vibrating along a Vertical Ellipse
51	Berlin L., Galyaev A., Lysenko P.	About Time-Optimal Control Problem for System of Two Non- Synchronous Oscillators
53	Biryukov R., Bubnova E.	Generalized H2-Norm of a Linear Impulsive System
57	Bolotnik N., Korneev V.	Control of the Switch-on Instant for a Shock Isolator that Protects an Object on a Movable Base from Impact Disturbances of Bounded Magnitude

61	Burkin I., Kuznetsov N.,Mokaev T.	Coexisting Chaotic and Periodic Attractors in a Counterexample to the Kalman Conjecture
65	Chichkanov I., Shawin M.	Algorithm for Finding the Optimal Obstacle Avoidance Maneuver for Wheeled Robot Moving Along Trajectory
68	Danik Yu., Dmitriev M., Murzabekov Z.	On the Stabilization of a Quasilinear Discrete SDC System with Control Constraints
72	Dmitriev M., Makarov D.	An Iterative Method for Regulator Construction in a Weakly Nonlinear Singularly Perturbed Control Problem
76	Dolgii Yu.	Approximation of the Problem of Optimal Impulse Stabilization for an Autonomous Linear System with Delay
78	Dolgii Yu., Chupin I.	Impulse Control of the Inertial Manipulation Robot
82	Dosaev M.	Influence of Lateral Force on the Sliding of a Body with Elastic Supports
84	Gadzhiev M., Kuleshov A.	The Problem of Motion of a Rigid Body with a Fixed Point in a Flow of Particles
88	Glumov V., Ermilov A.	Control of a Space Structure during its Assembly in Space
92	Glumov V., Puchkov A., Solovev A.	Features of Synthesis of a Multi-frequency Digital Control System Dynamic Object
95	Glushchenko A., Lastochkin K.	Neural Network-based Direct Model Reference Adaptive Control of Quadrotor Attitude
99	Golovanov S., Klimina L., Dosaev M., Selyutskiy Yu., Holub A.	A Trimaran Controlled by an Internal Flywheel
101	Golubev A.	Cerebral Blood Flow Regulation Using Nonlinear Control Theory Tools
104	Golubev Yu., Koryanov V., Melkumova E.	Rescuing a Six-Legged Walking Robot From an Emergency on an Uneven Surface
108	Gusev M., Osipov I.	On Local Control Synthesis for Nonlinear Systems under Integral Constraints
112	Holub A., Masterova A., Selyutskiy Yu., Zubkov A.	Characteristics of the Behavior of a Wheeled Cart with a Savonius Rotor
116	Kalashnikova M., Kurina G.	Direct Scheme of Constructing Asymptotic Solution of Three- tempo Linear-Quadratic Control Problems with Weak Nonlinear Perturbations
120	Kamenetskiy V.	New Applications of Pyatnitskiy's Convolution Theorem for Matrix Inequalities in Control Theory
124	Kayumov O.	On the Properties of the Time-Optimal Movement of a Platform with Oscillators
128	Khrustalev M., Rumyantsev D.	Synthesis of Ito's Equations Systems with a Given Output Spectrum

131	Khrustalev M., Tsarkov K.	Global Improvement Methods for State-Linear Controllable Dynamical Systems
135	Khryashchev S.	On Application of Multicomponent Continued Fractions to Control Problems for Dynamical Systems
139	Khusanov J., Yusupova Z., Akhmatov A.	On the Motion Control of a Five-Link Manipulator
143	Klimina L., Formalskii A.	On a Control to Pump a Swing
145	Kochetkov S.	Control of the Energy Process Generation of a Vehicle
149	Kokunko Yu., Krasnova S., Pivneva S.	Dynamic Generator of Permissible Trajectories for UAVs
153	Kostin G.	Optimization of Thermodynamic Processes in Heat-Conducting Rods Controlled by a Peltier Element
157	Kostin G., Gavrikov A.	Optimal Motion of an Elastic Rod Controlled by Piezoelectric Actuators and Boundary Forces
161	Krasinskiy A., Magomedov M.	Mathematical Modeling of the Dynamics of a Mechatronic System with an Electromagnetic Drive
164	Kumakshev S.	Optimization of the Parameters of the Two-link Leg of a Walking Robot
167	Mashtakov A., Podobryaev A.	Geodesic Flow of the Sub-Riemannian Structure of Engel Type with Strictly Abnormal Extremals
170	Morozov V., Kalenova V.	On Stabilization Problem of Magnetic Spacecraft Attitude Control
173	Okunev Yu., Privalova O., Samsonov V.	Isolated Modes of Gliding of a Heavy Finned Body
175	Palshin G.	Stability of Critical Trajectories in One Problem of Vortex Dynamics
178	Pavlenko V., Sesekin A.	Ulam-Hyers Stability of First and Second Order Differential Equations with Discontinuous Trajectories
182	Pesterev A., Morozov Yu.	Global Stability of a Switched Affine System
186	Podobryaev A.	Attainable Set for Rank 3 Step 2 Free Carnot Group with Positive Controls
190	Poliakov V., Saurin V., Demidov I.	On Extremum of a Quality Functuinal for Beam Briges with Optimal Stationary Control
193	Rapoport L., Generalov A.	On the Stabilization of an Inverted Pendulum With a Suspension Point on the Wheel
198	Rodnikov A.	On Stabilization of Bounded Trajectories of a Spacecraft with a Solar Sail near an Unstable Libration Point
201	Sachkova E.	Application of the Sub-Riemannian Problem with the Growth Vector (2, 3, 5, 8) to the Study of the Elasticity of a Homogeneous Beam

204	Sedova N., Druzhinina O.	Stabilization of State Constrained Delayed Systems Using Control-Lyapunov and Control-Barrier Functions
208	Semion A., Presnova A.	Optimal Control of Car Active Suspension Control under Delays
212	Shatov D.	Analysis of Stability and Dwell Time of a Certain Class of Switched Systems with Second Order Subsystems
216	Shchepakina E.	Unstable Invariant Manifolds in a Control Problem of the Combustion Process of a Gas Mixture
220	Smirnova V., Proskurnikov A., Utina N.	New Criteria for Self-Synchronization of Two Unbalanced Vibro- Exciters
224	Sobolev V.	Dimensional Reduction of Optimal Tracking Problems with a Given Reference Trajectory
227	Sokolov V.	Adaptive Optimal Stabilization of Discrete-Time Plant under Uncertainties and Biased Disturbance
231	Solodusha S.	Identification of Symmetric Volterra Kernels Using Piecewise Linear Test Signals
234	Somov Ye., Butyrin S., Somov S.	Control of a Space Robot-manipulator at Replacing the Fuel Tanks of a Geostationary Satellite
238	Somov Ye., Butyrin S., Somova T.	Autonomous Attitude Control of a Geostationary Satellite at Preparation for Long-term Conservation
242	Tkhai V.	Spatial Oscillations of a Physical Pendulum
246	Tormagov T., Rapoport L.	Coverage Path Planning with Constraints on Normal Curvature for a Three-dimensional Terrain with Obstacles
248	Tureshbaev A., Polyakhova E.	Stability of Collinear Libration Points in the Three-Body Photogravitational Problem under Internal Resonance
251	Ushakov V., Ershov A., Ushakov A., Kuvshinov O.	The Problem of Guidance the Integral Funnel to the Target Set
253	Utkin V., Gulyukina S.	Autonomous Control of the Rotational Speed of a Synchronous Generator by Voltage on the Excitation Winding
257	Yurchenkov A.	Chemical Reactor Estimation Based on Sensors Network with Dropouts
262	Yurchenkov A., Kustov A., Timin V.	Anisotropy-based Approach of Sensors Network Filtration: Nonzero Mean Disurbance Case
266	Yurkevich V., Bui Van Tam	PID Resonant Controller for Suppressing the Oscillations of an Elastic Suspension
269	Zykov I.	Approximation of Reachable Sets of Linear Control Systems under Different Types Constraints on the Control
_		