LIST OF PUBLICATIONS OF MIHAIL KONSTANTINOV

The research interests of Mihail Konstantinov are in the area of general and qualitative theory of differential and functional differential equations, asymptotic methods, control and systems theory, structural theory of linear systems, perturbation theory of operator equations and decompositions, numerical analysis, computer calculations, mathematical modeling, voting theory and applications of mathematics in mechanics and robotics. In many papers Mihail Konstantinov and his coauthors present a full research cycle consisting of

- creation of numerically reliable method
- development of the corresponding algorithm
- program implementation of the algorithm

The contributions of Mihail Konstantinov and his coauthors include, but are not limited to, the issues listed below.

1. Introduction of *functional differential equations with iterated delay* and finding conditions for existence, uniqueness and stability of their solutions; this is a *new class of equations* outside the framework of standard description of functional differential equations
2. Investigation of the stability of complex dynamical systems described by differential delayed equations in *critical cases of resonance*
3. Development of mathematical models for *analysis and control* of extremal systems, machine aggregates, linear motors and robots
4. Obtaining *estimates for the small parameter* in the problem of existence and uniqueness of the solution as well as in the implementation of the Poincaré method for differential and functional differential equations of second order

5. Justification of the averaging method for boundary value problems on *asymptotically large intervals*

6. Justification of the averaging method for differential equations with *asymptotically large delay*

7. Generalization of the *Gronwall-Bellman inequality* for functional differential equations; investigation and solution of other integral inequalities

8. Development of schemes for *parametric identification* of non-linear systems governed by equations with delay

9. Justification of *unified approach* to the synthesis and parametrization of linear control systems with incomplete state information, based on the property *mutual observation* between the coordinates of linear systems

10. Generalization of the *theorem of H. Rosenbrock* for description of the set of linearly equivalent attainable by linear feedback forms of linear time-invariant systems (LTIS) and parametrization of the set of transformation matrices

11. Introduction and analysis of *optimal trajectories of LTIS* generated by *non-optimal linear control laws* and parametrization of the non-optimal control laws which generate optimal trajectories

12. Proposal of schemes for analysis, stabilization and synthesis of LTIS with small delay for the cases of full and *incomplete state information*

13. Proof of the *numerical instability of the Schur* method for solving algebraic matrix Riccati equations and development of a scaling procedure for enhancing the performance of the method

14. Introduction and justification of *orthogonal and unitary canonical forms* of LTIS; nowadays these forms are the basis of reliable methods for numerical controllability analysis of LTIS

15. Justification of a family of numerically stable methods for modal control of LTIS known as *Petkov-Christov-Konstantinov methods*, or PCK-methods

16. The algorithmic and program implementation of PCK-methods is the *basis of modern program tools* for synthesis of LTIS; the PCK-methods are generalized to pole assignment synthesis under additional constraints thus utilizing fully the freedom in the synthesis of multi-input control systems

17. Publication of the first monograph *Computational Methods for Linear Control Systems* (Prentice Hall, 1991) devoted to modern numerical methods and algorithms for LTIS

18. Development of *portable codes* for scientific calculations in floating-point computing environment with automatic identification of the parameters of the machine arithmetic

19. Publication of the book *Robust Control Design with MATLAB* (Springer 2005, 2013) with two editions; translated also in Korean and Chinese and cited thousand times

20. Derivation of *local and non-local perturbation bounds* for general classes of linear and non-linear matrix algebraic, differential and difference equations

21. Proposal of new *improved first order perturbation bounds* and generalized condition numbers for matrix equations and decompositions thus extending previous perturbation estimates

22. Introduction of the *associated algebraic matrix Riccati equation* in the real and complex cases; local and non-local perturbation analysis of this equation as well as characterization and parametrization of the set of its solutions

23. Introduction and study of *general matrix Sylvester* and *Lyapunov operators* and their complete characterization; introduction of *Sylvester index* of general linear matrix operators as well as the continuous-time and discrete-time Lyapunov indexes of Lyapunov operators

24. Introduction and full description of *associated and Lyapunov-like additive operators* as well as associated and Riccati-like quadratic matrix operators

25. Creation and justification of the *method of splitting operators and Lyapunov majorants (MSOLM)* for local and non-local perturbation analysis of matrix problems involving unitary transformations

26. Application of MSOLM to finding *non-local perturbation bounds* for the following problems: Schur and QR decompositions of matrices, unitary and orthogonal canonical forms of LTIS, synthesis of state and output feedback including pole assignment, Hamilton-Schur canonical forms of matrices under the action symplectic unitary transformations

27. Introduction of *norm of additive operators* and its application to derive rigorous expressions for the condition numbers of complex matrix algebraic equations; as a by product existing perturbation bounds for complex matrix equations are corrected

28. Derivation of *general perturbation theory for matrix equations* using various techniques such as generalized Fréchet derivatives, improved first order perturbation bounds, norms of additive operators, equivalent operator equations, Lyapunov majorants and variants of fixed point principles

29. Obtaining new results in the theory of *differentiation of power matrix functions* with application to the approximation and perturbation analysis of matrix functions and equations

30. Publication of the first monograph *Perturbation Analysis in Linear Algebra and Control* (2003) devoted to the introduction, justification and systematic use of MSOLM in linear algebra and control

31. Development of *algorithms and computer codes* for numerical solution of algebraic matrix equations and analysis and design of LTIS with in-built condition and error estimators in machine arithmetic; the codes are included in the web-based computational system SLICOT

32. Obtaining theoretical and practical results in *voting theory* and its impact on the *election practice in Bulgaria*

Some of the contributions to theory of differential functional equations are joint with D. Bainov (1933-2011). The contributions to system and control theory are obtained jointly with P. Petkov and N. Christov as well as with D. Gu. A coauthor of M. Konstantinov, P. Petkov and N. Christov of the first publications devoted to systems theory was S. Patarinski (1948-1993). The contributions of M. Konstantinov to voting theory and its applications to voting practice in Bulgaria are joint with G. Pelova and K. Yanev.

In view of the above considerations Mihail Konstantinov and his coauthors D. Bainov, P. Petkov, N. Christov, S. Patarinski and G. Pelova have participated in the establishment of the Bulgarian schools in the following areas:

- general and stability theory for functional differential equations
- optimal control and systems theory
- perturbation analysis of matrix problems and operator equations
- numerical analysis and software in system theory
- education in mathematics
- voting theory and its applications

In what follows a list of selected publications of Mihail Konstantinov and his coauthors is presented. The following abbreviations are used.

Institutions

Abbreviation	**Institution**
BAES	Bulgarian Association on Electoral Systems
BAS	Bulgarian Academy of Sciences
BIAR	Bulgarian Institute of Analyses & Research
DA	Department of Automatics
EPU	European Polytechnical University
FM	Fakultät für Mathematik
GAS	Georgian Academy of Sciences
IM	Institut für Mathematik
LUED	Leicester University Engineering Department
PU	Plovdiv University
TUB	Technical University of Berlin
TUCZ	Technical University Chemnitz-Zwickau
TUS	Technical University of Sofia
(HIMEE)	(Higher Institute of Mechanical & Electrical Engineering)
UACEG	University of Architecture, Civil Engineering & Geodesy
(HIACE)	(Higher Institute of Architecture & Civil Engineering)
UBM	Union of Bulgarian Mathematicians
UC	University of Cambridge
UL	University of Leuven
UR	University of Ruse

Journals

Abbreviation	Journal (A – J)
AAT	Archiwum Automatyki i Telemechaniki
ACM-TMS	ACM Transactions on Mathematical Software
AdCM	Advances in Computational Mathematics
ACT	Automation & Computer Techniques
AM	Archivum Mathematicum
AMh	Archives of Mechanics
AMM	American Mathematical Monthly
AMR	Applied Mechanics Reviews
An	Annual
ARC	Automation & Remote Control
ATU-M	Annual Technical Universities–Mathematics
ATU-AM	Annual Technical Universities–Applied Mathematics
ATU-TM	Annual Technical Universities–Technical Mechanics
AUB-MS	Annals of the University of Bucharest–Mathematical Series
AUSB-SM	Annales Universitatis Scientiarium Budapestinensis Sectio Mathematica
BASSA-MN	Bulletin Académie Serbe Science et Arts– Mathématique et Naturelles
BMSSMR	Bulletin Mathématiques Société des Sciences Mathématiques de Roumanie
BPIJ	Bulletin Polytechnic Institute Jassy (NS)
CC	Control & Cybernetics
CCT	Cybernetics & Computational Techniques
CIT	Cybernetics & Information Technologies
CMSJB	Colloquia Mathematica Societatis Janos Bolyai
CSM	Control Systems Magazine
CR ABS	Comptes Rendus l'Académie Bulgare des Sciences
DMA	Discrete Mathematics & Applications
ETNA	Electronic Transactions on Numerical Analysis
IJACM	International Journal on Applied & Computational Mathematics
IJC	International Journal on Control
IJPAM	International Journal on Pure & Applied Mathematics
IJSS	International Journal on Systems Science
JAM	Journal on Applied Mathematics
JCAM	Journal on Computational & Applied Mathematics
JMMA	Journal on Mathematical Analysis & Applications
JNAAT	Journal on Numerical Analysis & Approximation Theory
JSSC	Journal on Scientific & Statistical Computations
JTAM	Journal on Theoretical & Applied Mechanics
JTUP	Journal of Technical University Plovdiv

Abbreviation	Journal (L – Z)
LAA	Linear Algebra & Applications
LNCIS	Lecture Notes on Control & Information Sciences
LNCS	Lecture Notes on Computer Science
MB	Mathematica Balkanica
MMAS	Mathematical Methods in Applied Sciences
MN	Mathematical Newsletter (Beograd)
MP	Mathematical Physics
MhP	Mechanics of Polymers
MR	Mathematical Reviews
MS	Machine Science
MV	Matematicki Vesnik
NFAO	Numerical Functional Analysis & Optimization
NVP	Nonlinear Vibration Problems
PAIP	Proceedings of the American Institute of Physics
PECR	Problems of Engineering Cybernetics & Robotics
(PTCR)	(Problems of Technical Cybernetics & Robotics)
PIMB	Publications de l'Institute Mathématique Beograd (NS)
PMD	Publicationes Mathematicae Debrecen
PMJBAS	Physical-Mathematical Journal of Bulgarian Academy of Sciences
PS	Podstawy Sterowania
PTC	Problems of Technical Cybernetics
RJM	Reference Journal on Mathematics (Russian)
RJMh	Reference Journal on Mechanics (Russian)
RJTC	Reference Journal on Technical Cybernetics (Russian)
RRMPA	Revue Roumanie Mathématiques Pures et Appliquées
RRST-SMA	Revue Roumaine Sciences Techniques– Série Mécanique Appliquée
SCL	Systems & Control Letters
SM-D	Soviet Mathematics–Doklady
SM-DE	Soviet Mathematics–Differential Equations
SM-IVUZ	Soviet Mathematics–Izvestiya VUZ
SMA	Surveys in Mathematics & Applications
SS	Systems Science
SSMH	Studia Scientiarum Mathematicarum Hungarica
TAC	Transactions on Automatic Control
TAM	Theoretical & Applied Mechanics
TR	Technical Report
TT	Technical Thought
UMJ	Ukrainian Mathematical Journal
UBPEF-SM	University of Belgrade, Publications of Electrotechnical Faculty–Series in Mathematics
ZM	Zentrallblatt für Matematik

Conferences

Abbreviation	Conference (A – N)
ACC	American Control Conference
ADP	Automation of Discrete Production
AI	Automation & Informatics
AIRTC	Artificial Intelligence in Real-Time Control
AMEE	Applications of Mathematics in Engineering & Economics
(AMEB)	(Applications of Mathematics in Engineering & Business)
AMh	Archives of Mechanics
AMT	Application of Mathematics to Techniques
CACSD	Computer Aided Control Systems Design
CAD	Computer Aided Design
CADCES	CAD of Control Engineering Systems
CADCS	CAD of Control Systems
CADMTS	CAD of Multivariable Technological Systems
CBSR	Computer Based Scientific Research
CCCTS	Control of Complex Chemical-Technological Systems
CDC	Control & Decision Conference
CP	Control Problems
CS	Cybernetics & Systems
CSCMP	Complex Systems: Control & Modeling Problems
CSD	Control System Design
CSR	Cybernetics & Systems Research
DEA	Differential Equations & Applications
ECC	European Control Conference
EIS	Education, Innovations, Science
EM	European Meeting
ES	Electoral Systems
FDM-TA	Finite Difference Methods–Theory & Applications
FDSRT	Functional Differential Systems & Related Topics
IC	International Conference
ICong	International Congress
IS	International Symposium
IR	Industrial Robots
ISPE	Identification of Systems Parameters & Estimation
IW	International Workshop
MADEA	Mathematical Analysis, Differential Equations & Applications
MM	Mathematical Modeling
MMSC	Mathematical Modeling & Scientific Computing
NCong	National Congress
NC	National Conference

Abbreviation	Conference (N – W)
NMA	Numerical Methods & Applications
NS	National Symposium
NSc	National School
NSCE	Numerical Software in Control Engineering
OAER	Optimization & Automation of Experimental Research
PCCS	Problems of Complex Control Systems
PER	Problems of Experimental Research
PES	Polish-English Seminar
Prep	Preprints
Proc	Proceedings
RTPC	Real Time Process Control
SC	Spring Conference
SCC	Software for Computer Control
SciC	Scientific Conference
SE	Systems Engineering
SCon	Stochastic Control
SMERQC	Statistical Methods in Experimental Research & Quality Control
SSch	Summer School
TAM	Theoretical & Applied Mechanics
TNPB	Thermal & Nuclear Problems in Bulgaria
WCong	World Congress

The list of publication is organized as follows.

Type of publication	Number of items	Numbered as
Books	20	1–20
Papers in refereed editions	299	21–319
Technical reports (tr)	47	320–366
Conference papers (cp)	174	367–540
Total	540	1–540

When different from English, the language of the publication is marked in brackets, namely (B) for Bulgarian and (R) for Russian. Some of the reference journals (Mathematical Reviews, Zentrallblatt für Matematik, etc.) are given when available.

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Remarks on the publications

The works of M. Konstantinov cover a period of 50 years (1969-2018) and may be classified as follows:

- monographs and textbooks
- papers in refereed editions
- preprints and technical reports
- conference papers

Many papers are included in electronic data bases and may be found therein in PDF format.

The books (monographs and textbooks) are cited more than 1 000 times by Bulgarian and foreign scientists and specialists. The other works are cited about the same number of times.

The total impact-factor (IF) of the journal papers is 42 with the individual IF of M. Konstantinov being 20. The latter is calculated dividing the IF of each paper to the number of authors.

M. Konstantinov has 75 co-authors and many collaborators. Some of them are listed below in alphabetic order.

A	Alexieva M, Angelova V
B	Bainov D, Balavesov V, Barraud A, Baruh I, Boneva J
C	Chikurtev D, Chivarov N, Christov N
D	Delov J, Dimiev S, Dobrinov V, Dontchev A
E	Enchev E
H	Hamamdjiev A, Higham N, Hristova S
G	Gancheva P, Gancheva Z, Genova P, Georgiev V, Germanov T, Gigov A, Goranov E, Gu D
I	Iliev G
K	Kawelke J, Konstantinov MS, Kouvaritakis B
L	Lazarov V, Lesecq S, Linnemann A
M	Marinov M, Markov E, Mehrmann V, Mihova L, Milusheva S, Mitev E
N	Nikolova T
P	Pasheva V, Patarinski S, Peeva M, Pelova G, Penev P, Petkov P, Petrova G, Peychev D, Popchev I, Postlethwaite I
R	Rangelov I
S	Shivarov N, Spasov V, Stainov G, Stanislavova M, Stefanov S, Stoev P
T	Tanev T, Todorov M, Todorov T, Todorov V, Toshev Y, Tsachouridis V
V	Velev K, Velev V, Vodenicharov V, Vulchanov N
X	Xu H
Y	Yanakiev K, Yanev K, Yonchev A, Yovchev K
Z	Zahariev A, Zhechev Y, Zimparov V

The cooperation of M. Konstantinov with some of his coauthors is very intensive. He has joint publications as follows: P. Petkov – 280 joint publications, N. Christov – 160, D. Bainov – 70, D. Gu – 60, S. Patarinski – 50, etc.

The works of M. Konstantinov have been cited more than 2000 times by other authors. His h, h_{10} and g indexes are 20, 30 and 45, respectively and his Erdösh number is 4.

Remark. The index h is the number of papers that are cited at least h times, h_{10} is the number of papers that are cited at least 10 times and g is the largest number such that the top most cited g publications have at least g^2 citations.

P. Erdösh has Erdösh number 0, his co-authors have Erdosh number 1, etc.