THE INTERNATIONAL MEMORIAL CONFERENCE DEDICATED TO VALENTIN VITAL'EVICH RUMYANTSEV☆

V.N. Tkhai (Chairman of the Organizing Committee)

The 10th International Ye. S. Pyatnitskii Seminar on "The Stability and Oscillations of Non-linear Control Systems" – a conference of the Russian Academy of Sciences for specialists in control, mechanics and applied mathematics – was held on 3–6 June 2008 at the V.A. Trapeznikov Institute of Control Systems (IPU) of the Russian Academy of Sciences. The 10th International Seminar was dedicated to the memory of the prominent specialist in the field of general mechanics and motion stability theory, Academician Valentin Vital'evich Rumyantsev.

Rumyantsev always supported the seminar, was a permanent member of its Programme Committee and repeatedly presented seminar papers. In 1992, he gave the very first plenary paper entitled "A. M. Lyapunov and the development of his ideas in motion stability theory". His last plenary paper was presented in 2006.

In opening the conference, the chairman of the Programme Committee, Academician S. N. Vasil'ev, spoke on the place the seminar occupied in the system of conferences of the Russian Academy of Sciences and on Rumyantsev's support for the seminar.

The main scientific topics of the 10th seminar were: general problems of the theory of stability and stabilization of motion; general problems and methods of the theory of non-linear oscillations; Lyapunov–function methods for non-linear control systems and the Hamilton–Jacobi–Lyapunov-Bellman method in the theory of optimal control and in game control problems; classical mechanics and non-linear dynamics; problems of the controllability and observability of control systems; problems of robust control; the control of mechanical systems; the stability and control of hybrid systems and systems with switches; applied control problems and computer methods.

The scientific programme consisted of three plenary sessions, 16 sectional meetings and a general discussion. The programme included 11 invited lectures (each 45 minutes long), 13 lectures on the scientific topics of the seminar (each 30 minutes long) and 179 papers (each 20 minutes long). Three additional papers were given outside the programme.

The memorial plenary session (on 3 June) opened with a paper by A. V. Karapetyan (Moscow State University) on "Academician Valentin Vital'evich Rumyantsev". A brief outline of his life, research and teaching activity was given, and his main results in the field of motion stability theory were reviewed, together with his results on the dynamics of bodies with liquid-filled cavities, satellite dynamics and the dynamics of rigid bodies with stationary points, bodies on planes, bodies suspended on strings, etc. Subsequent contributions (F. Pfeiffer, V. V. Beletskii, S. Ya. Stepanov, H. Troger, M. Pascal, A. M. Kovalev, A. G. Chentsov, K. Hedrich and G. A. Leonov) spoke of Rumyantsev's huge influence, the seminar he directed at the M.V. Lomonosov Moscow State University (MGU) and his results in the development of analytical mechanics and stability theory.

The remaining plenary lectures of the session were given by S. K. Korovin (MGU) on "The problem of controlling transport flows on motorways", and by Academician V. V. Kozlov (V.A. Steklov Institute of Mathematics of the Russian Academy of Sciences) on "The Lagrange identity and its generalizations".

At the plenary session on 4 June, lectures were given by Professor F. Pfeiffer (TU-Munich) "On non-smooth dynamics", by Professor V. Utkin (Ohio State University) "High-frequency oscillation suppression in sliding mode control systems", Academician V. F. Zhuravlev (the Institute of Problems in Mechanics (IPMekh) of the Russian Academy of Sciences) "The breakdown of non-linear generalized forces into potential and circular components" and Corresponding Member G. A. Leonov (St Petersburg State University, with coauthors N. V. Kuznetsov and Ye. V. Kudryashov) "Local methods for investigating cycles in dynamical systems".

At the final plenary session (on 6 June), lectures were given by Academician F. L. Chernous'ko (IPMekh) on "Mobile systems controlled by internal moving masses", Professor R. Shorten (The Hamilton Institute, Ireland) on "Positive dynamics and the Internet", and by Academician S. N. Vasil'ev (IPU, with coauthor N.V. Nagul, Institute of System Dynamics and Control Theory of the Siberian Branch of the Russian Academy of Sciences) on "Algebraic reductions in the analysis of dynamical systems."

Thirty-minute lectures were given on the following scientific topics: Professor A.S. Andreyev (Vl'yanovski State University) "The direct Lyapunov method in problems of the stability and stabilization of motion with respect to part of the variables", Professor V.N. Afanas'ev (Moscow State Institute of Electronics and Mathematics).

"D-robust control of a non-linear uncertain object", Professors V. Azhmyakov, V. G. Boltyanski and A. Poznyak (TU-Berlin and CINVESTAV, Mexico City) "First-order methods for hybrid system optimization", Professor A. D. Bruno (the M. V. Keldysh Institute of Applied Mathematics (IPM)) "Non-Lyapunov families of periodic solutions", Corresponding Member V. V. Beletskii (IPM) and A. V. Rodnikov (N. E. Bauman Moscow State Technical University) "A model of the dynamics of binary asteroids", Corresponding Member of the Ukrainian Academy of Sciences A. M. Kovalev (the Institute of Applied Mathematics and Mechanics, Donetsk) "The method of additional Lyapunov functions in stability problems", Professor A. P. Markeyev (IPMekh) "Some problems of the stability of rotations of a Mercury-type satellite", Professor V. A. Sarychev ((IPM) "The dynamics of a gyrostat satellite under the action of a gravitational moment", Professor Yu. V. Mikhlin (National Technical University "Khar'kov Polytechnic Institute") "Non-linear normal forms of oscillations and their application", Professor V. N. Tkhai (IPU) "Oscillations of quasi-autonomous reversible systems", Professors H. Troger, A. Teufel and A. Steindl (TU-Vienna) "Classification of non-smooth bifurcations for a friction oscillator" and Corresponding Member A. G. Chentsov "Extremal problems of routing with constraints".

Abstracts of all the papers presented in the programme of the seminar have been published in electronic format in Russian and in English on the website www.stab08.ru, which also contains all necessary information about the seminar.

In the general discussion (on 6 June), V. F. Zhuravlev raised the question of the relation between the results presented at the seminar and the results obtained by V. I. Zubov. It turned out that Zubov's results were unknown to him, and that he became acquainted with them only after he had presented his paper and they had been mentioned to him at the seminar. A. Yu. Aleksandrov also spoke about this relation. Zhuravlev then set out clearly what he saw as the similarities and differences between his work and Zubov's work on the breakdown of generalized forces into components. In the course of the discussion, the interesting question of the nature of circulation forces was also raised.

At the close, B. T. Polyak, A. V. Karapetyan, V. Utkin, H. Troger, K. Hedrich and S. N. Vasil'ev expressed their opinions on the scientific level and organization of the conference. In particular, the active participation in the conference of young scientists (over one-third of the participants) was mentioned. Interesting papers by young scientists were noted by the chairman of the Organizing Committee, V. N. Tkhai, who also thanked colleagues for taking part in the conference.

On the 4 June, participants visited the grave of V. V. Rumyantsev.

Acknowledgements

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