Pergamon
www.elsevier.com/locate/jappmathmech
PII: S0021-8928(02)00127-2
J. Appl. Maths Mechs, Vol. 66, No. 6, pp. 867–868, 2002

0021-8928/02/$—see front matter

VLADIMIR NIKOLAYEVICH KOSHLYAKOV (on his 80th birthday)†

Vladimir Nikolayevich Konshlyakov, renowned scientist in the field of theoretical and applied mechanics, celebrates his 80th birthday on 21 December 2002.

In 1948 he graduated from the Leningrad Institute of Precision Mechanics and Optics, was retained at the Institute as an assistant in the Department of Theoretical Mechanics, and in 1951, under the scientific guidance of D. R. Merkin, defended his Master's dissertation on the theory of aviation vertical gyros.

In 1952, he moved to Moscow where he began work in the Marine Research Institute of the USSR Ministry of the Shipbuilding Industry in the post of senior research fellow of the laboratory of gyroscopic compasses. Collaboration and contact with navigational apparatus development engineers, and participation in the work of a seminar run by A. Yu. Ishlinskii, a scientific consultant of the Institute, and also of a seminar run by N. G. Chetayev at the Institute of Mechanics of the USSR Academy of Sciences, did much to establish him as a great scientist in the field of the applied theory of gyroscopes.

In 1950–1960, Koshlyakov studied new sources of errors of two-rotor gyroscopic compasses that had appeared, in particular, during the operation of these instruments in high geographic latitudes. At that time, he took an active part in the testing of different gyrocompass systems on ships in the Black Sea, the Baltic, the Barents Sea, and the Kara Sea, and took part in a high-latitude expedition carrying out work in regions of Novaya Zemlya and Franz Josef Land.

A large number of his studies were devoted analysing the stability of gyroscopic compasses and were based on equations he derived as a generalization of equations proposed in 1933–1934 by Geckeler. He pointed out the need for a certain stability margin in course indication systems to ensure stability of the readings of these systems in ship manoeuvring. He solved the problem of the stability of motion

†*Prikl. Mat. Mekh.* Vol. 66, No. 6, pp. 908–910, 2002.

of a two-rotor gyrocompass in periodic ship manoeuvring; using Lyapunov's direct method, adequate criteria for the stability of a gyrocompass mounted on a base moving with respect to the earth were obtained. Taking into account the small dissipation forces that are always present in a real system, he constructed Lyapunov and Chetayev functions and produced stability (instability) criteria that were extremely simple to apply.

In connection with the development by industry of new-generation course indicators based on the use of a controllable (correctable) astatic gyroscope, begun at the start of the 1960s, Koshlyakov formulated theoretical prerequisites for the future use of such instruments for ships, which played a significant part in promoting the priority development of these instruments.

The problems noted above were generalized in his monograph *The Theory of Gyroscopic Compasses* (Moscow, 1972), which soon became a reference book for specialists.

His research was characterized by considerable analytical skill and by an ability to create successful mathematical models of the systems being investigated, to carry out a thorough analysis of these, and to formulate important conclusions and practical recommendations.

In 1961, for the results he had obtained, he was awarded the degree of Doctor of Physics and Mathematical Sciences without defending a dissertation. In 1975 he won a USSR State Prize for his studies in the field of mechanics.

Koshlyakov's Moscow period ended in 1978, when, in view of his election as a Corresponding Member of the Ukrainian Academy of Sciences, he moved to Kiev and started work at the Institute of Mathematics of the Ukrainian Academy of Sciences in the post of Head of the Department of Mechanics and Control Processes, subsequently renamed the Department of Analytical Mechanics. The favourable conditions for research at the academic institute gave him the opportunity to specialize in a problem that had long been of interest to him – the use of quaternions in the applied theory of gyroscopes and rigid body dynamics.

His first publications on this problem date back to 1964–1965. We note his generalization of the well-known Magnus formula in the theory of a gyroscope in a gimbal suspension, and also the class of exact solutions (in finite angles) he constructed for the equations of motion of a three-dimensional gyrocompass in Rodrigues–Hamilton parameters. This class of solutions can be extended, as shown by the author, to the case of a certain gyrostat with special control of borne bodies. He obtained an original matrix analogue, expressed in Rodrigues–Hamilton and Cayley–Klein parameters, of Euler's dynamic equations of the motion of a body about a stationary point in the general case. This analogue was used to investigate the stability of pseudoregular precessions of an asymmetrical heavy rigid body performing rapid rotation close to the vertical. The results noted above found expression in his monograph *Problems of Rigid Body Dynamics and the Applied Theory of Gyroscopes* (Moscow, 1985) and *The Rodrigues–Hamilton Parameters and their Applications in Rigid Body Mechanics* (Kiev, 1994).

In 1987, the Ukrainian Academy of Sciences awarded him the N. M. Krylov Prize for his studies on the analytical investigation of dynamical systems. In 1992 he was elected a full member of the Ukrainian Academy of Sciences. In 1996, the International Academy of Navigation and Control of Motion (Russia) elected him an honorary member.

He is the author of over 100 scientific papers.

Of the scientific results that he obtained in recent years, the general procedure for the structural transformations of the equations of motion of mechanical systems must be pointed out. This procedure, based on the transformation of the initial system to new variables using a Lyapunov matrix, simplifies the investigation of the stability of such systems when non-conservative positional forces are present in them.

For many years, he taught successfully in institutions of higher education in Leningrad, Moscow, and Kiev, presenting a general course on theoretical mechanics and a special course on the theory of gyroscopic instruments. His lectures, noted for their clarity and skill of presentation, were invariably beneficial to the students. On the basis of the lectures that he gave over a period of 16 years at the Kiev Polytechnic Institute, his textbook *A Short Course on Theoretical Mechanics* was published (Kiev, 1993). His pupils include 11 Masters of Science and six Doctors of Science.

He is currently Head of the Department of Analytical Mechanics at the Institute of Mechanics of the Ukrainian Academy of Sciences.

His work over many years has been recognized with government awards – orders and medals.

His friends and colleagues, pupils, the editorial staff, and the editorial board of *Prikladnaya Matematika i Mekhanika* wish him good health and future creative success for the good of science.

Translated by P.S.C.