

Our Hero of the Anniversary Arkadiy Alekseevich Chikrii

The famous Ukrainian mathematician and cybernetician, the specialist in the field of control processes and the theory of dynamic games, the Corresponding member of National Academy of Sciences of Ukraine and the member of editorial board of our journal Arkadiy Alekseevich Chikrii was 70 years old on July 20, 2015.

Arkadiy Chikrii became interested in mathematics when he was at school. He successfully took part in republican and all-union competitions in mathematics. After graduating with a golden medal from secondary school in urban village Satanova of Khmel'nitsky province he entered mechanical and mathematical faculty of Lvov Ivan Franko University. His first teacher was professor V.E.Liantse, a pupil of S. Banach who was one of founders of functional analysis. For three years under his leadership A.A. Chikrii was doing the research in the sphere of spectral theory of operators related to expansion of symmetric operators by Kalkin method based on Cayley transform.



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In 1967 as the student of the fifth course of the mechanical and mathematical faculty he was sent to practice in Kiev at the Institute of Cybernetics, in department headed by at that time a candidate of physical and mathematical sciences B.N. Pshenichnyi and stayed at the Institute for a long time. The circle of scientific interests of A.A. Chikrii was formed by the influence of Boris Nikolaevich.

While working in B.N. Pshenichnyi's department A.A. Chikrii spent a great deal of time at V.A. Steklov Mathematical Institute of RAS in Moscow in L.S. Pontryagin's department of differential equations as well as at N.N. Krasovskiy Institute of Mathematics and Mechanics in Yekaterinburg. Close cooperation with representatives of Moscow and Sverdlovsk scientific schools played an important role in A.A. Chikrii formation as a scientist.

The first scientific results forming the foundation of his PhD thesis (1972) have been obtained for discrete problems of approach-evasion. The author managed to construct analogues of upper and lower Pontryagin integrals that gave him a possibility to formulate the necessary and sufficient conditions of a game termination over a finite time. In this case he established the role of awareness in the game with the use of the operation of Minkovsky geometric difference. In particular, there were given simple conditions of complete sweeping sets in terms of their support functions which became the classical.

A wide range of results has been obtained by A.A. Chikrii in nonlinear theory of collision avoidance. Specialists are familiar with Pshenichnyi-Chikrii formula for representing a solution of nonlinear conflict-controlled system which gave impetus to this trend development after works of Pontryagin-Mishchenko for linear systems.

A.A. Chikrii had obtained sufficient evasion conditions in minimax and maximin form that allowed him to weaken Pontryagin condition formulating it in the form of ratio for the convex hulls of sets. In the theory of collision avoidance one well knows the evasion methods in direction, variable directions and invariant subspaces. A.A. Chikrii is their author. He and P.G. Gusyatinikov independently have first set and solved the problem on evasion from a group of pursuers. Here of importance is a certain minimaximin function which is now called by the name of A.A. Chikrii. These results have been summarized in his doctoral dissertation (1979).

The method of resolving functions in pursuit theory is probably one of the most significant scientific achievements of A.A. Chikrii. In particular he gives complete substantiation of the rule of parallel approach and interception by beam well known to designers of rocket and space technology.

Arkadiy Alekseevich has introduced a new mathematical concept of reverse Minkowski functionals which makes it possible to consider traditionally complex problems of group and alternate pursuit with the use of technique of multi-valued mappings. The method allowed one to study in a single scheme the game problems for systems of ordinary, integral, integro-differential and differential-difference equations, equations with fractional derivatives of Riemann-Liouville, Caputo, Miller-Ross, Hilfer, Grynald-Letnikov for discrete and impulse processes.

Lately jointly with Professors of Kharkov Yu. Karazin University L.A. Vlasenko and A.G. Rutkas there has been performed an important cycle of works related to differential games for equations with distributed parameters of Sobolev type.

A.A. Chikrii has proposed the positional method of group pursuit generalizing the rule of N.N. Krasovskiy extreme aiming for quasi-linear systems, developed the method of searching for moving objects which is based on bilinear Markov models.

Since 1991 Arkadiy Alekseevich has been the head of department of controlled processes optimization in V.M. Glushkov Institute of Cybernetics of NAS of Ukraine.

In parallel with theoretical research A.A. Chikrii actively works in the field of applications. Jointly with the staff he has developed an interception system of moving targets, created a modeling complex and a control system of spacecrafts, a complex for modeling of processes of searching for moving marine objects, the control system of an aircraft "soft landing" on an aircraft carrier.

A.A. Chikrii is the author of more than 400 works, among which there are 5 monographs and 26 international surveys in books of groups of authors in Birkhauser, Springer, Pergamon, Elsevier, Taylor and Francis publishing houses, Proceedings of the Steklov Institute of Mathematics, Int. Math. Banach Center Publ. and others. A.A. Chikrii's monograph Conflict Controlled Processes, Kluwer Academic Publ., 1997, 424 p. was reissued in 2010 by Springer publishing house.

He has prepared around 40 candidates and doctors of sciences, he is Soros Professor (1994–1996), Corresponding member of NAS of Ukraine (1997), Laureate of State Price of Ukraine (1999), V.M. Glushkov price (2003), is the member of an editorial board of some international scientific journals including "Proceedings of the V.A. Steklov Institute of Mathematics, Ekaterinburg branch".

When worldwide known scientist, Academician of NAS of Ukraine B.N. Pshenichnyi had prematurely passed away Arkadiy Alekseevich took over and headed the Ukrainian school of dynamic games which continues to hold leading positions.

For a long time he has been doing lecturing at the cybernetics faculty of Kiev Taras Shevchenko National University, at the faculty of computer science of National Technical University of Ukraine "Kiev Polytechnical Institute", at the faculty of applied mathematics of Chernovtsy Yuriy Fedkovich University.

As everyone Arkadiy Alekseevich has a hobby. This is a sport. For him even mathematics is a sport for brain. Doing many kinds of sport he was the most successful in volleyball. As a student he played for 5 years presenting Lvov University, at senior courses – in the students' team of Lvov — "Burevestnik" (Lvov). Working at the Institute in 1973 he played for the national team of Ukraine at All-Union academiad and became its winner.

Arkadiy Alekseevich has high capacity for work, extraordinary erudition, he has his own principles, a keen sense of justice, strong will character and is exceptionally friendly in communication. He meets his jubilee with great creative energy, new plans, keeping on his fruitful scientific and pedagogical activity.

Friends, colleagues and pupils heartily congratulate Arkadiy Alekseevich with glorious jubilee, wish him good health, new creative achievements and successes.

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