

The main direction of scientific research of the department is geometric modeling of objects, phenomena and technological processes within the scientific specialty 05.01.01 "Applied geometry, engineering graphics". The formation of the scientific school of the department began with the research of teachers A. Pavlov, N. Vitkup, and A. Krota in the field of theoretical foundations of image methods and mechanization of graphic works in the 40s of the last century. Further development of scientific research took place under the leadership of the head of the department, academician of the Academy of Sciences of the Higher School of Ukraine, honored employee of the higher school of Ukraine, doctor of technical sciences, professor A. Pavlov in the direction of creating new methods of designing and reproducing the surfaces of lethal aircraft assemblies and geometric modeling of multiparameter problems in technology. Research was carried out jointly with the Antonov Kyiv Mechanical Plant, the Kyiv Aviation Production Association, and the Research Institute of Aviation Technology. As a result of cooperation, systems of geometric calculations "Sigma" and "Sygrant" were created at the enterprises of the industry. Professors V. Nadolnny, Y. Badaev, and S. Grybov worked in this direction, also associate professors V. Zalevsky, A. Bliok and others.

The needs of agricultural production of Ukraine in the intensification of soil processing processes with the help of energy and environmentally friendly technologies and the development of salt marsh lands in the south of Ukraine were determined by the range of research in the field of geometric modeling of the surfaces of the working bodies of tillage machines. The research was carried out jointly with the research institute of sugar beet, the Ternopil and Odesa plants of agricultural machinery, the Kyiv plant "Bilshowyk". Professor V. Korabelsky, Professor V. Yurchuk, A. Pavlovsky and O. Khmelenko worked on this topic. In this direction, the teachers of the department received more than 100 copyright certificates for inventions, 12 patents (Ukraine, GDR, France, China, India, Hungary, Bulgaria). Industrial and serial samples of agricultural equipment were created, medals of the VDNH of the Ukrainian SSR were received, a monograph was published (Prof. V. Yurchuk).

Scientific and methodical work of the department was carried out on the organization of students' independent work. The term "parallel education" became the basis of H. Hnitska's dissertation for obtaining the scientific degree of Candidate of Pedagogical Sciences.

The department continues scientific work in traditional directions. The main direction is the geometric modeling of technological processes in aircraft construction: from the modeling of aircraft surfaces (CAD design) to the automated preparation of their reproduction (CAD technology). Professors V. Vanin (head), V. Shepel, G. Vlasjuk are working in this direction.

Together with the Antonov Aviation Scientific and Technical Complex, a method of geometric modeling of the formation of the external surfaces of the aircraft was developed at the stage of sketch design in the conditions of modern integrated computer technologies. This ensures the process of coordination of design requirements in the chain "aerodynamics - strength - layout - construction - technology" (Ph.D. V.Vanin, Ph.D. G.Virchenko). Development of the theory and methodology of plasma-free reproduction of templates and units in aircraft construction, creation of appropriate interfaces "automated design of aircraft surfaces" - "Automated reproduction" (V. Vanin, V. Shepel, Ph.D.) were carried out.

Work continues in the field of modeling of multi-criteria problems of science and technology (Professor M.Humen). Professor V.Yurchuk also worked in the field of modeling processes and surfaces of working bodies of tillage machines in agricultural production. Teachers and graduate students of the department take part in many international conferences on the problems of applied geometry, in particular in the 10th world conference on geometry and graphics.

The teachers of the department have published more than 1,200 scientific works. The department trained 15 doctors of technical sciences: A. Pavlov (1966), V. Korabelskyi (1987), V.Nadolinnyi (1989), Y. Badaev (1991), M.Humen (1992), S. Hrybov (1995), V. Vanin (1996), E. Martyn (2000), H. Vlasyuk (2000), Y. Doroshenko (2002), V. Yurchuk (2002), V. Shepel (2004), V. Vetokhin (2010), G. Virchenko (2011), O. Humen (2011) and 48 candidates of sciences.