Monday, April 6, 2026
from 4:45 p.m. to 6:20 p.m. (Moscow time)
room 16-10 and ZOOM translation

Nikolay P. Dolbilin

From a polyhedron to its unfolding and back

There will be discussed two open problems in the theory of convex three-dimensional polyhedra.

One of them is the so-called Dürer problem (1970, G. Shephard, previously known as folklore) about the existence for any convex polyhedron a net, i.e., a connected, edge, self-nonintersecting unfolding. In other words, the problem is whether it is possible to cut the surface of a convex polyhedron along some of its edges so as to unfold it onto a plane into a simple polygon. A number of results and conjectures will be discussed. In particular, the "Anti-Dürer" hypothesis will be formulated.

Another problem is related to the famous A.D. Alexandrov theorem, which was a solution to the Weyl problem for a polyhedral metric and served as the basis for solving this problem in the general case (Alexandrov). This theorem provides the necessary and sufficient conditions for a general unfolding to be a an unfolding of a certain convex polyhedron. The polyhedron with the unfolding is unique up to congruence. A very difficult (in the opinion of A.D. Alexandrov himself) problem is how to reconstruct this single polyhedron according to a given unfolding. In particular, it will be described how to reconstruct a polyhedron from an unfolding having no more than 5 vertices of positive curvature (result obtained jointly with M.I. Shtogrin).

SCIENTIFIC SEMINAR
"DIFFERENTIAL GEOMETRY AND APPLICATIONS"

headed by Academician of RAS Anatoly T. Fomenko

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