Monday, November 23, 2026, from 4:45 p.m. to 6:20 p.m. (Moscow time), room 16-10 and ZOOM translation

Vasily O. Manturov

The groups G_n^k, braid groups and configuration spaces

A fundamental principle formulated by V. O. Manturov relates the dynamics of the motion of n objects to topological invariants: if the system enjoys a codimension 1 property corresponding to exactly k particles, then it yields invariants with values in the groups G_n^k. By 2020, when the book *Invariants and Pictures* appeared, methods based on these groups already covered a wide range of problems in low-dimensional topology, including knots, links and braid invariants.

In 2026 the principle was substantially generalised: it is no longer tied exclusively to braid groups and applies to considerably broader classes of situations. New structures have emerged — groups with quadratic relations: groups admitting a presentation in which every relator is the square of a word in the generators. They arise in the study of configuration spaces of a much more general nature than in the classical setting of braid groups. Configuration spaces of points and submanifolds play the key role here, together with stratifications determined by conditions on the relative position of the objects.

The talk is devoted to this new direction: groups with quadratic relations, their connection with configuration spaces, and the spectrum of applications, and concludes with open problems ranging from algebraic geometry to mechanics.

References

(1) Manturov V. O., Fedoseev D. A., Kim S., Nikonov I. M. Invariants and Pictures: Low-Dimensional Topology and Combinatorial Group Theory. Singapore: World Scientific Publishing, 2020. 388 p. (Series on Knots and Everything; Vol. 66). DOI: 10.1142/11821.

(2) Manturov V. O. Generalizations of the groups G_n^k: graphs, moduli spaces, algebraic geometry, spherical braids. arXiv preprint, August 2026. `https://arxiv.org/abs/2608.07976`.

(3) Manturov V. O. Groups of Transverse Stratifications and the Hierarchy of Configuration Spaces. arXiv preprint, September 2026. `https://arxiv.org/abs/2609.02123`.

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