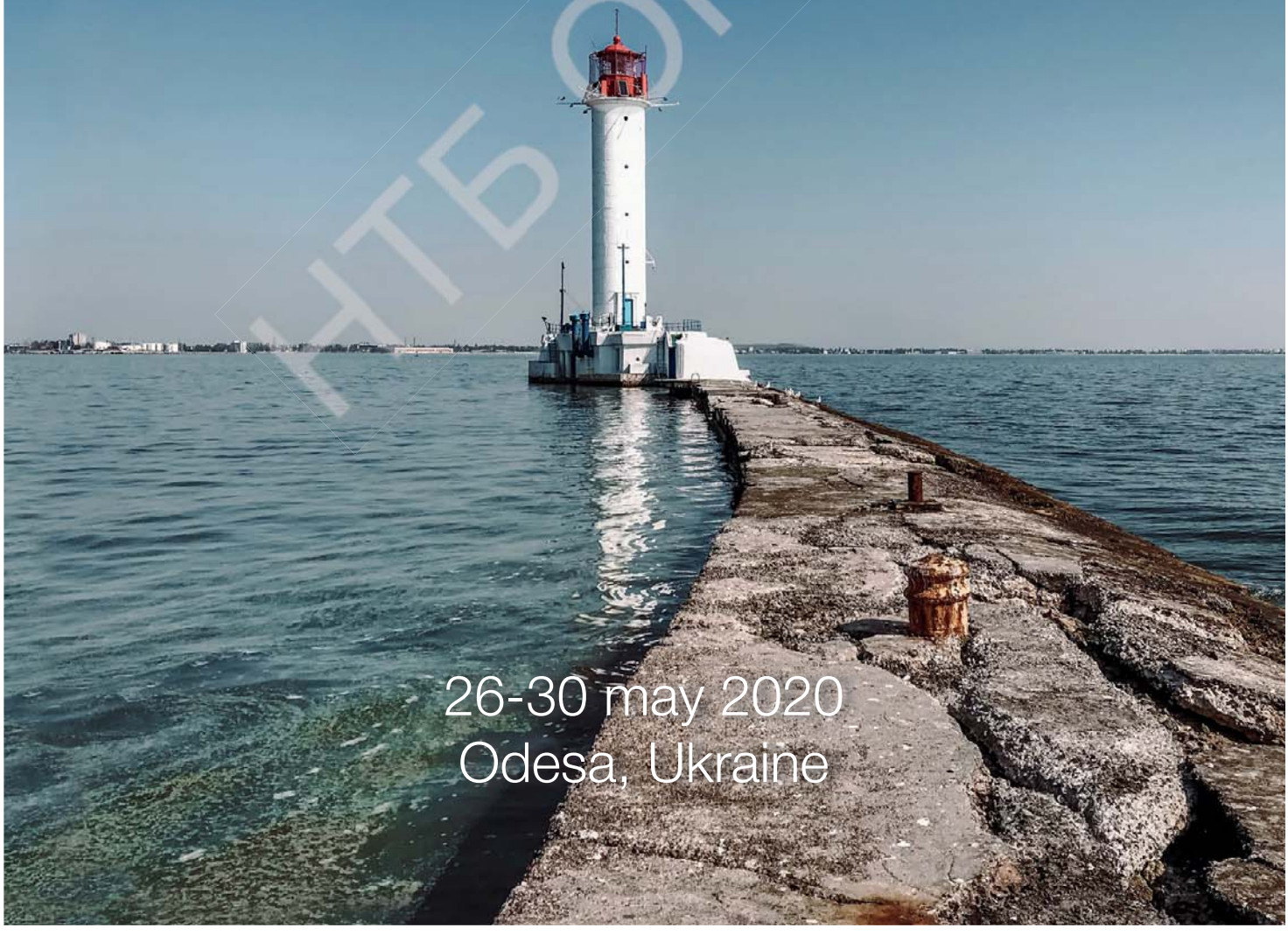
International
Scientific Conference

Algebraic and Geometric Methods of Analysis



26-30 may 2020
Odesa, Ukraine

List of topics

- Algebraic methods in geometry
- Differential geometry in the large
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Dynamical systems and their applications
- Geometric problems in mathematical analysis
- Geometric and topological methods in natural sciences

Organizers

- Ministry of Education and Science of Ukraine
- Odesa National Academy of Food Technologies
- Institute of Mathematics of the National Academy of Sciences of Ukraine
- Odessa I. I. Mechnikov National University
- Taras Shevchenko National University of Kyiv
- International Geometry Center
- Kyiv Mathematical Society

Program Committee

Chairman: Prishlyak A.
(*Kyiv, Ukraine*)
Balan V.
(*Bucharest, Romania*)
Banakh T.
(*Lviv, Ukraine*)
Bolotov D.
(*Kharkiv, Ukraine*)
Borysenko O.
(*Kharkiv, Ukraine*)
Cherevko Ye.
(*Odesa, Ukraine*)
Fedchenko Yu.
(*Odesa, Ukraine*)
Karlova O.
(*Chernivtsi, Ukraine*)
Kiosak V.
(*Odessa, Ukraine*)
Kirillov V.
(*Odesa, Ukraine*)
Konovenko N.
(*Odesa, Ukraine*)
Lyubashenko V.
(*Kyiv, Ukraine*)
Maksymenko S.
(*Kyiv, Ukraine*)
Matsumoto K.
(*Yamagata, Japan*)
Mormul P.
(*Warsaw, Poland*)
Mykhailyuik V.
(*Chernivtsi, Ukraine*)
Plachta L.
(*Krakov, Poland*)
Pokas S.
(*Odesa, Ukraine*)
Polulyakh E.
(*Kyiv, Ukraine*)
Sabitov I.
(*Moscow, Russia*)
Savchenko A.
(*Kherson, Ukraine*)
Sergeeva A.
(*Odesa, Ukraine*)
Shelekhov A.
(*Tver, Russia*)
Volkov V.
(*Odesa, Ukraine*)
Zarichnyi M.
(*Lviv, Ukraine*)

Administrative committee

- Egorov B., chairman, rector of the ONAFT;
- Povarova N., deputy chairman, Pro-rector for scientific work of the ONAFT;
- Mardar M., Pro-rector for scientific-pedagogical work and international communications of the ONAFT;
- Fedosov S., Director of the International Cooperation Center of the ONAFT;
- Kotlik S., Director of the P.M. Platonov Educational-scientific institute of computer systems and technologies "Industry 4.0";
- Svytyy I., Dean of the Faculty of Computer Systems and Automation.

Organizing commitee

Kirillov V.
Konovenko N.
Fedchenko Yu.
Maksymenko S.
Cherevko Ye.
Osadchuk E.
Prus A.

Framed cobordism of systems of submanifolds in the classification of free quotients

Lukasz P. Michalak
(Adam Mickiewicz University in Poznań, Poznań, Poland)
E-mail: lukasz.michalak@amu.edu.pl

In this talk we will show how framed cobordism of systems of non-separating 2-sided submanifolds in a closed manifold can be used to classify epimorphisms onto free groups up to equivalence and strong-equivalence. Such a classification is known for surface groups and was done by Grigorchuk–Kurchanov–Zieschang by using other methods. We use an extended Pontryagin–Thom construction to associate for any system of submanifolds an induced homomorphism to a free group. We will present geometric operations on submanifolds which realize elementary Nielsen transformations on induced homomorphisms. These results are motivated by the notion of Reeb graph of a function on a manifold, which leads to both free quotient and system of submanifold.

The results are from joint work with Wacław Marzantowicz.

References

[1] R. I. Grigorchuk, P. F. Kurchanov and H. Zieschang, *Equivalence of homomorphisms of surface groups to free groups and some properties of 3-dimensional handlebodies*, Proceedings of the International Conference on Algebra, Part 1 (Novosibirsk, 1989), 521–530, Contemp. Math. 131, Part 1, Amer. Math. Soc., Providence, RI, 1992.

[2] W. Marzantowicz and L. P. Michalak, *Relations between Reeb graphs, systems of hypersufaces and epimorphisms onto free groups*, preprint (2020), arXiv:2002.02388.