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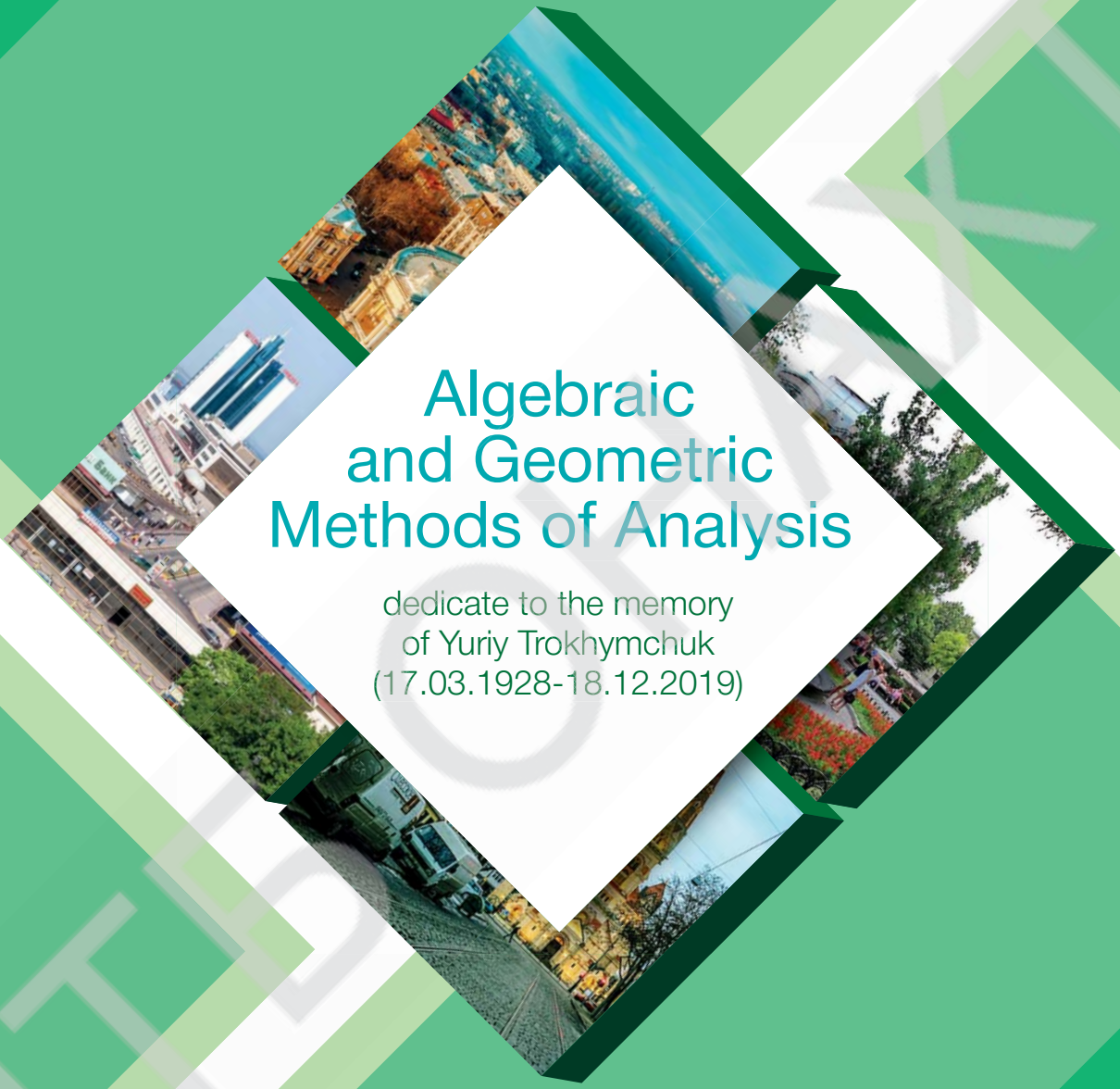

Algebraic and Geometric Methods of Analysis

dedicate to the memory
of Yuriy Trokhymchuk
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List of topics

- Topological methods in analysis
- Geometric problems of complex and mathematical analysis
- Algebraic methods in geometry
- Differential geometry in the whole
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Geometric and topological methods in natural sciences

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Onto the some dynamic applications via quaternions

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Quaternion algebra, which generate the complex numbers in four dimensions, is one of the significant tools for not only mathematics but also physical applications [1, 2]. Quaternionic representations can be used some subfields of physics such as classical mechanics [3, 4], quantum mechanics [5], electromagnetism [6], linear gravity [7, 8], plasma [9] and fluid systems [10] etc. In this work, the quaternions with real coefficients and their some properties have been defined. By this way, the quaternionic descriptions of the rotation, translation and both two motions of the rigid body have been written in a detail manner and the applicable examples have been given. Then, the force and torque terms on the object have been presented and exemplified by using quaternion concept. Moreover, the manual operations have also been verified with the help of computer programs such as Mathematica and Matlab [11, 12]. As a consequence, it is said that the quaternion algebra is the important and practical mathematical structures for applicable sciences.

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