

International scientific conference

**“Algebraic and Geometric
Methods of Analysis”**

Book of abstracts



May 28 - June 3, 2019

Odesa, Ukraine

Conference webpage: imath.kiev.ua/~topology/conf/agma2019/

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- Algebraic methods in geometry
- Differential geometry in the large
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- General and algebraic topology
- Dynamical systems and their applications
- Geometric problems in mathematical analysis
- Geometric and topological methods in natural sciences
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ІНСТИТУТ
ОПРАЦІ

On isometries satisfying deformed commutation relations

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We consider certain perturbation of family of pairwise orthogonal isometries. Namely, we study properties and representation theory of C^* -algebra $\mathcal{E}_{1,n}^q$ generated by isometries $t, s_j, j = \overline{1, n}$, subject to the relations

$$s_i^* s_j = 0, \quad i \neq j, \quad t^* s_j = q s_j t^*.$$

In recent paper [1] was studied the C^* -algebra $\mathcal{E}_{n,m}^q$ with $n, m \geq 2$, generated by families $\{t_j\}_{j=1}^m$ and $\{s_i\}_{i=1}^n$. In particular, it was shown that for $|q| < 1$ one has $\mathcal{E}_{n,m}^q \simeq \mathcal{E}_{n,m}^0$ and for $|q| = 1$ the C^* -isomorphism class of quotient of $\mathcal{E}_{n,m}^q$ by the unique largest ideal is independent of q and isomorphic to the tensor product of Cuntz algebras $\mathcal{O}_n \otimes \mathcal{O}_m$.

We show that the result for $|q| < 1$ remains true for $\mathcal{E}_{1,n}^q$.

Theorem 1. *For any $q \in \mathbb{C}$, $|q| < 1$, one has an isomorphism $\mathcal{E}_{1,n}^q \simeq \mathcal{E}_{1,n}^0$.*

Notice that the proof contains an explicit construction of the required isomorphism, which is similar to the one given in [1].

For the case $|q| = 1$ we obtain the following facts.

Definition 2. The Fock representation, π_F^q , of $\mathcal{E}_{1,n}^q$, is the unique up to unitary equivalence irreducible $*$ -representation having the vacuum vector Ω , $\|\Omega\| = 1$, such that

$$\pi_F^q(s_j^*)\Omega = 0, \quad \pi_F^q(t^*)\Omega = 0, \quad j = \overline{1, n}.$$

Theorem 3. *The Fock representation of $\mathcal{E}_{1,n}^q$ exists and is faithful.*

Theorem 4. *The C^* -algebra $\mathcal{E}_{1,n}^q$ is nuclear.*

Also we prove an analog of Wold decomposition Theorem for such family of isometries, and study irreducible representations corresponding to each of its components.

REFERENCES

- [1] A. Kuzmin, V. Ostrovskiy, D. Proskurin and R. Yakymiv. On q -tensor product of Cuntz algebras, preprint (2019), <https://arxiv.org/abs/1812.08530>

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