Non-Commutative Spheres

III. Irrational Rotations

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Dedicated to Professor Huzihiro Araki on the occasion of his 60'th birthday

Abstract. Let A_θ be the irrational rotation algebra, i.e. the C^*-algebra generated by two unitaries U, V satisfying $VU = e^{2\pi i\theta}UV$, with θ irrational, and consider the fixed point subalgebra B_θ under the flip automorphism $U \to U^{-1}$, $V \to V^{-1}$. We prove that B_θ is an AF-algebra.

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1. Introduction

In this paper we continue the study, begun in [BEEK 1] and [BEEK 2], of the fixed point subalgebra of the rotation algebra under the flip. Recall from [Rie] that the rotation algebra A_θ is the universal C^*-algebra generated by two unitaries U, V satisfying $VU = \varrho UV$, where $\varrho = e^{2\pi i\theta}$ and $0 \leq \theta < 1$. The flip σ is the automorphism of this algebra defined through the requirements

$$\sigma(U) = U^{-1}, \quad \sigma(V) = V^{-1}. \tag{1.1}$$

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