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Constructions of smooth and analytic cocycles over irrational circle rotations

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Abstract: We define a class of step cocycles (which are coboundaries) for irrational rotations of the unit circle and give conditions for their approximation by smooth and real analytic coboundaries. The transfer functions of the approximating (smooth and real analytic) coboundaries are close (in the supremum norm) to the transfer functions of the original ones. This result makes it possible to construct smooth and real analytic cocycles which are ergodic, ergodic and squashable (see [Aaronson, Lemańczyk, Volný]), of type III_0, or which are coboundaries with nonintegrable transfer functions. The cocycles are constructed as sums of coboundaries.

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