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Title:	On the Rationality of the Spectrum
Authors:	Madan, Shobha (/jspui/browse?type=author&value=Madan%2C+Shobha)
Keywords:	Spectral sets Spectrum Fuglede's conjecture Recurrence sequences Zeros of exponential polynomials Rationality
Issue Date:	2018
Publisher:	Springer Ltd
Citation:	Journal of Fourier Analysis and Applications, 24(4), pp. 1037–1047
Abstract:	Let $\Omega \subset \mathbb{R}$ be a compact set with measure 1. If there exists a subset $\Lambda \subset \mathbb{R}$ such that the set of exponential functions $E\Lambda := \{e^{i\lambda x} = e^{2\pi i \lambda x} \Omega : \lambda \in \Lambda\}$ is an orthonormal basis for $L^2(\Omega)$, then Λ is called a spectrum for the set Ω . A set Ω is said to tile \mathbb{R} if there exists a set \square such that $\Omega + \square = \mathbb{R}$, the set \square is called a tiling set. A conjecture of Fuglede suggests that spectra and tiling sets are related. Lagarias and Wang (Invent Math 124(1–3):341–365, 1996) proved that tiling sets are always periodic and are rational. That any spectrum is also a periodic set was proved in Bose and Madan (J Funct Anal 260(1):308–325, 2011) and Iosevich and Kolountzakis (Anal PDE 6:819–827, 2013). In this paper, we give some partial results to support the rationality of the spectrum.
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