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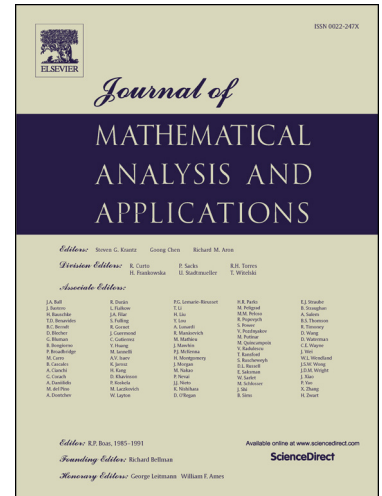
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## SPECTRALITY OF CERTAIN MORAN MEASURES WITH THREE-ELEMENT DIGIT SETS

ZHI-YONG WANG, XIN-HAN DONG\*, AND ZONG-SHENG LIU

ABSTRACT. Let  $\mathcal{D}_n = \{0, a_n, b_n\} = \{0, 1, 2\}(\text{mod } 3)$ ,  $p_n \in 3\mathbb{Z}^+$ ,  $n \geq 1$ , satisfy  $\sup_{n \geq 1} \frac{\max\{a_n, b_n\}}{p_n} < \infty$ . It is well-known that there exists a unique Borel probability measure  $\mu_{\{p_n\}, \{\mathcal{D}_n\}}$  generated by the following infinite convolution product

$$\mu_{\{p_n\}, \{\mathcal{D}_n\}} = \delta_{p_1^{-1}\mathcal{D}_1} * \delta_{(p_1 p_2)^{-1}\mathcal{D}_2} * \cdots$$

in the weak convergence. In this paper, we give some conditions to ensure that there exists a discrete set  $\Lambda$  such that the exponential function system  $\{e^{2\pi i \lambda x}\}_{\lambda \in \Lambda}$  forms an orthonormal basis for  $L^2(\mu_{\{p_n\}, \{\mathcal{D}_n\}})$ .

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### 1. Introduction

Let  $\mu$  be a probability measure with compact support on  $\mathbb{R}^n$ . We call it a spectral measure if there exists a discrete set  $\Lambda \subset \mathbb{R}^n$  such that  $E_\Lambda := \{e^{2\pi i \langle \xi, \lambda \rangle} : \lambda \in \Lambda\}$  forms an orthonormal basis for  $L^2(\mu)$ . The set  $\Lambda$  is then called a spectrum for  $\mu$ . The existence of spectrum for  $\mu$  was initiated by Fuglede in his seminal paper [11]. The first example of a singular, non-atomic, spectral measure was constructed by Jorgensen and Pedersen in [14]. This surprising discovery received a lot of attention. The spectral property of fractal measures becomes an active research area, and more spectral fractal measures were found in [15, 19] and [1–3, 5, 9, 12, 13, 17]. The spectral property, Fourier transform [16, 21, 22] and Cauchy transform [6–8, 18] of fractal measure form the main topics in the analysis on fractals.

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