Metrical properties of α-Rosen continued fractions

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α-Rosen continued fractions generalize both Rosen continued fractions (where the partial quotients are multiples of $\lambda = 2\cos(\pi/q)$ for some integer $q \geq 3$) and Nakada's α-expansions. For $\alpha \in [1/2, 1/\lambda]$, we study metrical properties of the corresponding continued fraction transformation

$$T(x) = \left|\frac{1}{x}\right| - \left\lfloor \left|\frac{1}{x\lambda}\right| + 1 - \alpha \right\rfloor \lambda$$

and its natural extension

$$\mathcal{T}(x,y) = \left(T(x), \frac{1}{r\lambda + \varepsilon y}\right),$$

where $r = \left\lfloor \left|\frac{1}{x\lambda}\right| + 1 - \alpha \right\rfloor$ and $\varepsilon = \operatorname{sgn}(x)$.

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