σ-ASYMPTOTICALLY LACUNARY STATISTICAL EQUIVALENT FUNCTIONS ON AMENABLE SEMIGROUPS

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Abstract
We introduce the concepts of $S_\sigma$-asymptotically equivalent, $S_{\sigma, \lambda}$-asymptotically equivalent, $\sigma$-asymptotically lacunary statistical equivalent and strong $(\sigma, \theta)$-asymptotically equivalent functions defined on discrete countable amenable semigroups, and establish certain inclusion theorems.

1. Introduction
Let $E$ be a subset of $\mathbb{N}$ and $\chi_E$ be the characteristic function of $E$. Natural density of $E$ is defined by $d(E) := \lim_{n \to \infty} \frac{1}{n} \sum_{j=1}^{n} \chi_{E}(j)$ whenever the limit exists.