Erdős measures on Euclidean space and $\widehat{Z}^n$

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What one can say about the distribution of the random variable:

$$\zeta = A^{-1}\xi_1 + A^{-2}\xi_2 + \dots,$$

where $\xi_k \in Z^n$ are independent identically distributed random variables, $0 < P(\xi_1 = 0) < 1$, the expanding matrix $A \in GL(n, Z)$.

We will call the distribution of the random variable ζ the *Erdős measure* on the space R^n.

Another question is what one can say about the distribution of the random variable:

$$\widehat{\zeta} = \xi_1 + A\xi_2 + A^2\xi_3 + \dots,$$

Here $\zeta \in \widehat{Z}^n$, where $\widehat{Z}^n$ is the profinite extension of Z^n with respect to $Z^n > AZ^n > A^2Z^n > \dots$

We will call the distribution of the random variable $\widehat{\zeta}$ the *Erdős measure* on the group $\widehat{Z}^n$. We give some answers to these questions.

We use the notions of A-invariant Erdős measure on the torus and the invariant Erdős measure on the compact abelian group $\widehat{Z}^n$.