Pair Correlation of Squares in $p$-Adic Fields

Alexandru Zaharescu

Abstract. Let $p$ be an odd prime number, $K$ a $p$-adic field of degree $r$ over $\mathbb{Q}_p$, $O$ the ring of integers in $K$, $B = \{\beta_1, \ldots, \beta_r\}$ an integral basis of $K$ over $\mathbb{Q}_p$, $u$ a unit in $O$ and consider sets of the form $N = \{n_1\beta_1 + \cdots + n_r\beta_r : 1 \leq n_j \leq N_j, 1 \leq j \leq r\}$. We show under certain growth conditions that the pair correlation of $\{uz^2 : z \in N\}$ becomes Poissonian.