Year: 2019 | **Vol.: 95** | **Fasc.: 3-4**

Title: On a characterization theorem on non-discrete totally disconnected locally compact fields

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We prove the following theorem. Let X be a non-discrete totally disconnected locally compact field, R be its ring of integers, P be the nonzero prime ideal of R. Assume that the residue field R/P is a field of characteristic $p > 2$. Let ξ and η be independent identically distributed random variables with values in X and distribution μ, such that μ has a continuous density with respect to a Haar measure on X. This implies that the random variables $S = \xi + \eta$ and $D = (\xi - \eta)^2$ are independent if and only if μ is a shift of the Haar distribution of a compact subgroup of X.

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