On First Passsage Times of q-Random Walks

Thomas Kamalakis and **Malvina G. Vamvakari** [1]

Department of Informatics and Telematics
Harokopio University
Athens, Greece

Abstract

Recently, Vamvakari [1], introduced a q-random walk process $\{X_{n,q}(t), t > 0\}$, $0 < q < 1$, where the random variable $X_{n,q}(t)$, for every $t > 0$, represents the position of the q-random walk during the parts of a suitable defined partition of time interval $(0, t]$. This q-random walk, asymptotically, as $n \to \infty$, is approximated by a *q-Brownian motion*. The q-Brownian motion is the continuous analogue of the q-random walk process and is distributed according to a linear transformed standardized Stieltjes-Wigert distribution. In this work, we study first time passages of this q-random walk and of its approximation. Moreover, we introduce a multivariate q-Random Walk process and we also study its first time passages.

References

[1] M.G. Vamvakari, *A q-Random Walk Approximated by a q-Brownian Motion*, Electronic Notes in Discrete Mathematics **59** (2017), 51-63.

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[1] Email: `mvamv@hua.gr`