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# Editorial: Long-range dependent processes: theory and applications, volume II

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## Editorial on the Research Topic

## Long-range dependent processes: theory and applications, volume II

The topic of the theory and applications of long-range dependent (LRD) processes attracts the interests of researchers ranging from physics to computer science. The theory of LRD processes is worth paying attention to because they substantially differ from conventional random processes. To be precise, in the time domain, the autocorrelation function of an LRD process is slowly decayed such that it is non-integrable. Accordingly, in the frequency domain, the power spectrum density of an LRD process is of  $1/f$  noise. Moreover, in the probability space, the probability density function of an LRD process is heavy tailed. LRD processes may be a powerful tool to investigate complex phenomena of random data and the research of applications of LRD processes is encouraged. The family of LRD processes is rich. Taking into account five papers collected in this Research Topic, we note two models of LRD processes. One is the fractional Gaussian noise (fGn) when  $0.5 < H < 1$ , where  $H$  stands for the Hurst parameter, and the other is the generalized Cauchy process with  $0.5 < H < 1$ .

The paper by Avraham and Pinchas is entitled “Performance of the modified clock skew estimator and its upper bound for the IEEE 1588v2 (PTP) case under packet loss and fractional Gaussian noise environment.” That gives the novel study and achieves the considerable advances regarding precision time protocol in computer networks by using fGn for  $0.5 < H < 1$ . Song et al. paper, entitled “A Wi-Fi dynamic routing algorithm based on energy prediction for wildlife monitoring wireless network” presents a new low energy dynamic routing protocol based on energy prediction by analyzing the characteristics of fGn for  $0.5 < H < 1$  regarding the remaining energy time series of wireless network nodes, a significant advance in protocol design in an application of computer communications to ecological engineering. The authors, Dong et al., give the paper, which is with the title “Identification technique of cryptomining behavior based on traffic features,” proposes a novel identification of technique cryptomining behavior by taking into account the LRD property of network traffic, bringing forward a new research direction in the aspect of applications of LRD traffic. The title of paper by

Dmitriev et al. is “*Effective precursors for self-organization of complex systems into a critical state based on dynamic series data.*” It exhibits that embedding dimension, correlation dimension and approximation entropy may serve as effective early warning measures in a real system when its structure is analogous to that of a sand cellular automaton. He et al. paper is novel and interesting in the application of the generalized Cauchy process to modeling the global sea surface chlorophyll concentration. The paper title is “*Spatially heterogeneity of long-range dependence and self-similarity of global sea surface chlorophyll concentration with their environmental factors analysis.*”

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## Conflict of interest

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