Symposium MATHEMATICS AND APPLICATION, Faculty of Mathematics, University of Belgrade, 2025

A Limit Theorem for the Normalized Maximum of Gaussian Processes

Goran Popivoda

University of Montenegro, Faculty of Science and Mathematics
e-mail: goranp@ucg.ac.me
ORCID: 0000-0003-0196-7419

Abstract. The central question in extreme value theory is to understand the behavior of the maximum of a random process over an extended period. Specifically, can we identify normalizing constants a_T and b_T such that the normalized maximum $a_T(M(T) - b_T)$ converges to a non-degenerate distribution, as $T \to \infty$? The theory for stationary processes is well-developed. Our goal is to address one of the simplest yet non-trivial cases of non-stationarity: a stationary Gaussian process to which a deterministic trend function, $g(t)$, has been added. The presence of this trend breaks the stationarity and fundamentally alters the problem, necessitating a modified approach to classical methods.

Keywords: stationary Gaussian processes; asymptotic theory; limit theorem; normalized maximum