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LIMIT DISTRIBUTIONS OF EXTREME ORDER STATISTICS FOR THE GENERALIZED PARETO DISTRIBUTION

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ABSTRACT

The generalized Pareto distribution (GPD) is a useful probability model in the case of exceedance above a high threshold. It can be reduced to uniform, exponential, and Pareto distributions according to different values of its parameters. The GPD is widely used in various fields, including actuarial sciences, economics, engineering, and numerous other disciplines ([1, 2]). Considering the importance of extreme values in applications, we study the necessary and sufficient conditions of the domain of minimal and maximal attractions for the GPD. Domains of the minimal and maximal attractions are obtained based on the various cases of the shape parameters. Necessary and sufficient conditions are checked for convergence for minimum and maximum order statistics following the result summarized by Fisher and Tippett [3]. The asymptotic results are compared with exact values by variability measures.

Keywords Asymptotic distribution · Domain of attraction · Extreme value theory · Order statistics · Generalized Pareto distribution

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