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Maximum interpoint distance of high-dimensional random vectors

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A limit theorem for the largest interpoint distance of p i.i.d. points on $\mathbb{R}^n$ to the Gumbel distribution is proven, where the number of points $p = p_n$ tends to infinity as the dimension of the points n tends to infinity. The theorem holds under moment assumptions and corresponding assumptions on the rate of p. The proof is based on the Chen-Stein Poisson approximation method and uses the sum structure of the interpoint distances. Therefore, an asymptotic distribution of a more general object is derived.

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