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SMALL-SAMPLE CORRECTIONS TO KOLMOGOROV-SMIRNOV TEST STATISTIC

Jan Vrbik

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Abstract

Testing whether a random variable has a specific distribution is often done by Kolmogorov-Smirnov test; the CDF of the corresponding test statistic approaches, asymptotically (with increasing sample size) a Jacobi theta function. Unfortunately, the convergence is rather slow (for a sample of size $n = 100$, the maximum error is still about 2.6%); in this article we derive $n^{-1/2}$ and n^{-1} -proportional corrections to this approximation to make it substantially more accurate, even when used with a sample size as small as 10.

Keywords and phrases: Kolmogorov-Smirnov test, highly accurate approximation, Jacobi theta function.