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FÜR MATHEMATIK, INFORMATIK
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Kolloquium über Mathematische Statistik und Stochastische Prozesse

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Tests of independence for sparse contingency tables and beyond

Abstract:

New statistics are proposed for testing the hypothesis that arbitrary random variables are mutually independent. These tests are consistent and well-behaved for any type of data, even for sparse contingency tables and tables whose dimension depends on the sample size. The statistics are Cramér-von Mises and Kolmogorov-Smirnov type functionals of the empirical checkerboard copula. The asymptotic behavior of the corresponding empirical process will be characterized and illustrated; it will also be shown how replicates from the limiting process can be generated using a multiplier bootstrap procedure. As will be seen through simulations, the new tests are considerably more powerful than those based on the Pearson chi squared and likelihood ratio, and perform very well compared to other tests often used in this context.

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