



UNIVERSITÀ DEGLI STUDI  
DI TRENTO

Dipartimento di Informatica  
e Studi Aziendali

## SEMINARI DISA

# TESTS BASED ON SPACINGS AND THEIR DUALITY WITH CHI-SQUARE TESTING

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As is well known, the goodness-of-fit problem can be reduced, through a probability integral transformation, to testing randomness or uniformity on the interval  $[0, 1]$ . Among tests based symmetrically on the  $m$ -step spacings, a generalized Greenwood statistic based on the sum of squares of these spacings can be shown to be locally most powerful. On the other hand one may consider a competing chi-square statistic with expected frequency of  $m$  in each cell, which is again locally most powerful among tests based symmetrically on the observed frequencies. There is a duality between such spacings tests which compare the observed and expected cell lengths while holding the observed number in each cell to  $m$ , and the chi-square tests which compare the observed and expected frequencies while holding the expected number in each cell to  $m$ . By considering a suitable sequence of alternatives, we compare the asymptotic relative efficiencies of these two competing tests as well as a third entropy type test based on the  $m$ -step spacings. These comparisons indicate the superiority of the spacings tests.

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