

# ON LARGE SAMPLE PROPERTIES OF CERTAIN NONPARAMETRIC PROCEDURES

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## 1. Summary and introduction

Efficiencies of one sided and two sided procedures are considered from the standpoint of risk. It is shown that the two sided Kolmogorov-Smirnov (K-S) and Kuiper procedures, which were shown in [4] to be asymptotically efficient with the median for translation alternatives for symmetric unimodal distributions, have efficiencies for sample sizes in a wide range in the general vicinity of that of the median; but even if certain standard asymptotic approximations can be made, the efficiencies are not too close to that of the median, and in many cases the dominant asymptotic correction term does not even yield the sign of the deviation for samples of size  $10^{20}$ .

A procedure briefly discussed in [1], for which the Pitman efficiency is zero, has good Bayes risk efficiency for translation alternatives for any distribution and merits further work for two sided testing.

In the one sided case, the one sided K-S procedure appears to be somewhat worse to much worse than a procedure introduced by the author in [3]. Also, the K-S procedure involves a choice of significance level which is highly distribution dependent.

We shall consider the "moderately large sample" efficiencies of certain well known and not sufficiently well known nonparametric procedures from a decision theoretic standpoint. By "moderately large sample" we shall mean that central limit type theorems yield adequate approximations to the distributions involved, but that the further asymptotic approximations of the type in [4] are not necessarily very good. We shall also assume that the samples under consideration are sufficiently large that the large sample form of the risk can be used.

That is, we shall carry out our computations as if the observations can be considered as a stochastic process on  $[0, 1]$  such that

$$(1.1) \quad X(t) = \theta h(t) + Y(t),$$

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