Borkowf, Craig B.
Computing the nonnull asymptotic variance and the asymptotic relative efficiency of Spearman's rank correlation. (English) Zbl 0990.62042

Summary: Over the past century, Spearman's rank correlation, ρ_s, has become one of the most commonly used nonparametric statistics, yet much remains unknown about its finite and asymptotic behavior. This paper presents a method for computing the asymptotic variance of the point estimate, $\hat{\rho}_s$, in terms of expectations of the joint and marginal distribution functions, for any underlying bivariate distribution that satisfies minimal regularity conditions. Also presented are numerical results for certain bivariate distributions of interest in order to demonstrate that distributions with similar values of Pearson's or Spearman's correlations can yield surprisingly different values for the asymptotic variance of $\hat{\rho}_s$.

In particular, these results emphasize that one should not use certain standard procedures for hypothesis testing and confidence interval construction that assume bivariate normality without first checking this distributional assumption. Finally, these numerical results are used to compute the asymptotic relative efficiency of Spearman's rank correlation compared to Pearson's correlation.

MSC:

62G20	Asymptotic properties of nonparametric inference
62H20	Measures of association (correlation, canonical correlation, etc.)
65C60	Computational problems in statistics (MSC2010)

Cited in **8** Documents

Keywords:

asymptotic relative efficiency; asymptotic variance; empirical distribution functions; Fisher's transformation; simulations; Spearman's rank correlation

Software:

GAUSS

Full Text: DOI

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