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Georgia Southern: Examines Estimation of P (X > Y) when X and Y are Dependent Random Variables

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The stress-strength models have been intensively investigated in the literature in regards of estimating the reliability θ = P (X > Y) using parametric and nonparametric approaches under different sampling schemes when X and Y are independent random variables. In this paper, we consider the problem of estimating θ when (X, Y) are dependent random variables with a bivariate underlying distribution. The empirical and kernel estimates of θ = P (X > Y), based on bivariate ranked set sampling (BVRSS) are considered, when (X, Y) are paired dependent continuous random variables. The estimators obtained are compared to their counterpart, bivariate simple random sampling (BVSRS), via the bias and mean square error (MSE).

We demonstrate that the suggested estimators based on BVRSS are more efficient than those based on BVSRS. A simulation study is conducted to gain insight into the performance of the proposed estimators. A real data example is provided to illustrate the process.

"Estimation of P (X > Y) when X and Y are dependent random variables using different bivariate sampling schemes," was published in Communications for Statistical Applications and Methods.

Dr. Hani Samawi, Professor of Biostatistics at the Jiann-Ping Hsu College of Public Health Georgia Southern University (JPHCOPH), was the lead author. Dr. Haresh Rochani, Director of the Karl E. Peace Center for Biostatistics (JPHCOPH) and Jingjing Yin, Assistant Professor of Biostatistics (JPHCOPH) were co-authors.

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