

**Maximum Likelihood Estimation  
of Bivariate Survival Probabilities**

by

Sin-Soo Kang and Kenneth J. Koehler  
Iowa State University

**ABSTRACT**

Nonparametric maximum likelihood estimation of bivariate survival probabilities is developed for interval censored survival data. We restrict our attention to the situation where response times within pairs are not distinguishable, and the univariate survival distribution is the same for any individual within any pair. Campbell's (1981) model is modified to incorporate this restriction. Existence and uniqueness of maximum likelihood estimators are discussed. This methodology is illustrated with a bivariate life table analysis of an angioplasty study where each patient undergoes two procedures.

KEY WORDS: Bivariate survival analysis; Interval censoring; Product limit estimator; Greenwood's formula.