ASYMPTOTIC THEOREMS FOR ESTIMATING THE DISTRIBUTION FUNCTION UNDER RANDOM TRUNCATION

WEI-MIN HUANG[1] AND WEI-YANN TSAI[2]

[1] *Department of Mathematics, Lehigh University, Bethlehem, PA 18015, U.S.A.*
[2] *Applied Mathematics Department, Brookhaven National Lab., Upton, NY 11973, U.S.A.*
and Division of Biostatistics, School of Public Health, Columbia Univ.

Abstract.   Representation theorem and local asymptotic minimax theorem are derived for nonparametric estimators of the distribution function on the basis of randomly truncated data. The convolution-type representation theorem asserts that the limiting process of any regular estimator of the distribution function is at least as dispersed as the limiting process of the product-limit estimator. The theorems are similar to those results for the complete data case due to Beran (1977, *Ann. Statist.*, **5**, 400–404) and for the censored data case due to Wellner (1982, *Ann. Statist.*, **10**, 595–602). Both likelihood and functional approaches are considered and the proofs rely on the method of Begun *et al.* (1983, *Ann. Statist.*, **11**, 432–452) with slight modifications.