Ann. Inst. Statist. Math.
Vol. 55, No. 4, 765–796 (2003)
©2003 The Institute of Statistical Mathematics

RESAMPLING TIME SERIES USING MISSING VALUES TECHNIQUES

ANDRÉS M. ALONSO[1,2], DANIEL PEÑA[2] AND JUAN ROMO[2]

[1] *Department of Mathematics, Universidad Autónoma de Madrid, 28049-Madrid, Spain*
[2] *Department of Statistics and Econometrics, Universidad Carlos III de Madrid, 28903-Getafe, Spain*

(Received October 17, 2001; revised January 31, 2003)

Abstract. Several techniques for resampling dependent data have already been proposed. In this paper we use missing values techniques to modify the moving blocks jackknife and bootstrap. More specifically, we consider the blocks of deleted observations in the blockwise jackknife as missing data which are recovered by missing values estimates incorporating the observation dependence structure. Thus, we estimate the variance of a statistic as a weighted sample variance of the statistic evaluated in a "complete" series. Consistency of the variance and the distribution estimators of the sample mean are established. Also, we apply the missing values approach to the blockwise bootstrap by including some missing observations among two consecutive blocks and we demonstrate the consistency of the variance and the distribution estimators of the sample mean. Finally, we present the results of an extensive Monte Carlo study to evaluate the performance of these methods for finite sample sizes, showing that our proposal provides variance estimates for several time series statistics with smaller mean squared error than previous procedures.

Key words and phrases: Jackknife, bootstrap, missing values, time series.