

$J_1$  CONVERGENCE OF PARTIAL SUM PROCESSES WITH A REDUCED  
NUMBER OF JUMPS

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*Abstract:* Various functional limit theorems for partial sum processes of strictly stationary sequences of regularly varying random variables in the space of càdlàg functions  $D[0, 1]$  with one of the Skorokhod topologies have already been obtained. The mostly used Skorokhod  $J_1$  topology is inappropriate when clustering of large values of the partial sum processes occurs. When all extremes within each cluster of high-threshold excesses do not have the same sign, Skorokhod  $M_1$  topology also becomes inappropriate. In this paper we alter the definition of the partial sum process in order to shrink all extremes within each cluster to a single one, which allows us to obtain the functional  $J_1$  convergence. We also show that this result can be applied to some standard time series models, including the GARCH(1, 1) process and its squares, the stochastic volatility models and  $m$ -dependent sequences.

**2000 AMS Mathematics Subject Classification:** Primary: 60F17; Secondary: 60G52, 60G55.

**Keywords and phrases:** Functional limit theorem, partial sum process, regular variation, Skorokhod  $J_1$  topology, Lévy process, weak dependence, mixing.

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