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Kernel estimators of mode under ψ-weak dependence

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Abstract Nonparametric kernel-type estimation is discussed for modes which maximize nonparametric kernel-type density estimators. The discussion is made under a weak dependence condition which unifies weak dependence conditions such as mixing, association, Gaussian sequences and Bernoulli shifts. Consistency and asymptotic normality are established for the mode estimator as well as for kernel estimators of density derivatives. The convergence rate of the mode estimator is given in terms of the bandwidth. An optimal bandwidth selection procedure is proposed for mode estimation. A Monte-Carlo experiment shows that the proposed bandwidth yields a substantially better mode estimator than the common bandwidths optimized for density estimation. Modes of log returns of Dow Jones index and foreign exchange rates of US Dollar relative to Euro are investigated in terms of asymmetry.