

## On the convergence in law of some empirical estimators

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### Abstract

Let  $\eta_T = \{\eta_T(x), x \in \mathbb{R}\}$ ,  $T > 0$ , be a family of measurable real-valued processes on  $\mathbb{R}$  with paths in  $\mathcal{B}_b$ , the class of real-valued Borelian bounded functions, which converges in law in  $\mathcal{B}_b$  to a process  $\eta$ , as  $T$  goes to  $\infty$ . The aim of this work is to establish conditions on the processes  $\eta_T$ ,  $T > 0$ , and on the real-valued process  $(X_t)_{t \geq 0}$  for the weak convergence of the average

$$\frac{1}{T} \int_0^T \eta_T(X_t) dt,$$

as  $T$  goes to  $\infty$ . Our method is based on local time and a stochastic version of the occupation time formula proved with Karhunen Loève series expansion. Then we present an application of this result to the estimation of the distribution of an ergodic diffusion process.