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Adina Oprisan*, oprisana@canisius.edu. *An invariance principle for additive functionals of Semi-Markov processes.*

In this paper we study a class of additive functionals of semi-Markov processes $W(t) = \int_0^t f(X_s) ds$, where $\{X_t, t \geq 0\}$ is an ergodic semi-Markov process with invariant distribution π and $f \in L^2(\pi)$. Using a martingale decomposition approach we proved that the sequence $W_t^n = \frac{1}{\sigma\sqrt{nm}} \int_0^{nt} f(X_s) ds$ converges in distribution to the Wiener process W on $\mathcal{D}([0, \infty), E)$, with $m = E_\pi(X_1)$. The martingale decomposition is also crucial in proving that the aforementioned convergence in distribution admits an almost sure version - a functional almost sure central limit theorem. Applications to some autoregressive processes will be also discussed. (Received September 19, 2016)