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Hanbaek Lyu* (colourgraph@gmail.com), 231 W 18th ave, Columbus, OH 43210, and **David Sivakoff** (dsivakoff@stat.osu.edu), 231 W 18th ave, Columbus, OH 43210. *Persistence of sums of correlated increments and clustering in cellular automata.*

We consider sums of increments given by a functional of a stationary Markov chain. Letting T be the first return time of the partial sums process to $(-\infty, 0]$, under general assumptions, we determine the asymptotic behavior of the survival probability, $\mathbb{P}(T \geq t) \sim Ct^{-1/2}$ for an explicit constant C . Our analysis is based on a connection between the survival probability and the running maximum of the time-reversed process, and relies on a functional central limit theorem for Markov chains. Our result extends the classic theorem of Sparre Anderson on sums of mean zero and independent increments to the case of correlated increments. As applications, we recover known clustering results for the 3-color cyclic cellular automaton and the Greenberg-Hastings model in one dimension, and we prove a new clustering result for the 3-color firefly cellular automaton. (Received September 14, 2017)