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CONDITIONS FOR CONVERGENCE OF NUMBER OF CROSSINGS TO THE LOCAL TIME APPLICATION TO STABLE PROCESSES WITH INDEPENDENT INCREMENTS AND TO GAUSSIAN PROCESSES

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Abstract: Let $X(t)$, $t \in R$, be a real valued stochastic process admitting a local time and let $X_\varepsilon(t), \varepsilon \in R^+$, be a family of *smooth* processes which converge in some sense to $X(t)$. We exhibit sufficient conditions for L^2-convergence of the number of crossings of $X_\varepsilon(t)$ to the local time of $X(t)$, after normalization.

Two main cases are considered for $X(t)$, stable processes and Gaussian processes.

Two main cases are considered for $X_\varepsilon(t)$: $X_\varepsilon(t)$ being the convolution of $X(t)$ with a size ε approximate identity and $X_\varepsilon(t)$ being the size ε polygonal approximation of $X(t)$.

Such a convergence is shown to hold for both approximations when $X(t)$ is a stable process with independent increments with index $\alpha > 1$.

Convergence of crossings of the polygonal approximation is shown to hold for a Gaussian process under technical conditions.

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