On an Approach to Boundary Crossing by Stochastic Processes

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ABSTRACT: TWe provide an overview as well as new (definitive) results of an approach to boundary crossing. The first published results in this direction appeared in Evarist Gine's book on decoupling. They include order of magnitude bounds for the first hitting time of the norm of continuous Banach-Space valued processes with independent increments. One of our main results is a sharp lower bound for the first hitting time of càdlàg real-valued processes $X(t)$, where $X(0) = 0$ with arbitrary dependence structure: $ET_r^\gamma \geq \int_0^1 \{a^{-1}(r\alpha)\}^\gamma d\alpha$, where $T_r = \inf\{t > 0 : X(t) \geq r\}$, $a(t) = E\{\sup_{0\leq s\leq t} X(s)\}$ and $\gamma > 0$.

This is joint work with Mark Brown, Michael Klass, and Tony Sit.