Hitting times for the Brownian motion and Bessel processes: some new algorithms

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The aim of this talk is to introduce new numerical methods for the hitting time of some boundaries for a class of stochastic processes. We will start by constructing the walk on moving spheres method for Bessel processes. We will apply this result for the simulation of the Brownian motion hitting times. This algorithm exhibits a new procedure which efficiently approximate both the hitting time and the hitting position of the stochastic process and can be used in problems arising from finance, geophysics or neuroscience.

We give also the convergence results and present some numerical examples that permit to emphasise the efficiency and accuracy of this new method.

This is a joint work with Samuel Herrmann (Dijon University, France).