

Institute for Applied Mathematics, Bonn University

## Oberseminar Stochastik

Thursday, 10 January 2019, 16:30

Lipschitz-Saal (LWK 1.016)

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## Sticky Diffusions & their Numerical Solution

Feller's boundary condition for Brownian motion extends the classical Dirichlet, Neumann and Robin conditions – corresponding to killed, reflecting and elastic Brownian motions, respectively – to second-order derivative boundary conditions which give rise to 'sticky' boundary behavior. In this talk, we revisit Brownian motions with Feller's boundary condition, and show, for the first time, how to capture their dynamics using a simple modification of the random walk approximation of Brownian motion. We then generalize this result to high-dimensional sticky diffusion processes. Our approximation turns out to be thousands of times faster than a penalty method.

This approximation builds on ideas in "Continuous-time Random Walks for the Numerical Solution of Stochastic Differential Equations", AMS Memoir, ISBN: 978-1-4704-3181-5. The talk itself is based on a forthcoming paper with Miranda Holmes-Cerfon (Courant Institute, NYU).