Sensitivity analysis for diffusion processes constrained to an orthant

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This paper studies diffusion processes constrained to the positive orthant, and investigates changes in the steady-state distribution of such diffusions under infinitesimal changes in the drift. Our first main result states that any constrained function and its drift-derivative is the unique solution to an augmented Skorohod problem. Our second main results uses this characterization to prove that the steady-state distribution of the joint processes (diffusion and its derivative processes) satisfies a basic adjoint relation. We specialize the technique to the case of reflected Brownian motion.

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