

# SIMULATING CONDITIONED DIFFUSIONS ON MANIFOLDS

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Simulation of bridge processes is a widely used tool for statistical inference for stochastic processes. Such processes arise when the original process is conditioned to be in a given state at a given time. A common tool to study bridge processes is Doob's  $h$ -transform. However, a problem with the transformation is that it relies on the, typically intractable, transition density of the process. We instead consider the technique of conditioning by guiding, which circumvents this problem by using the same transformation but with a different  $h$ -function whilst maintaining absolute continuity with respect to the true bridge process.

The talk will focus on conditioning manifold-valued semimartingales. We describe semimartingales on manifolds through the so-called “rolling without slipping” (Eells-Elworthy-Malliavin) construction: Mapping an  $\mathbb{R}^d$ -valued semimartingale to the frame bundle of the manifold and then projecting it back to the manifold.

In the talk I will discuss the construction of manifold-valued semimartingales and then move to the simulation of bridge processes through guiding.