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**Approximate Zero-Variance Simulation in Rare Event Settings**

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**Abstract:** We first provide an overview of the difficulties encountered in rare-event simulation. Without special techniques, the required amount of simulation time for the rare events to be observed sufficiently to provide a meaningful estimator is often prohibitive. We summarize the main ideas and methods that can substantially reduce the computing time to obtain a reliable estimate. They are based primarily on importance sampling and splitting, which we will explain. Implementing these techniques is not always easy and we will provide insight on how this should be done, together with some concrete examples. Much of the talk will be of a tutorial nature. It will also cover some recent developments.