Monte Carlo Pathwise Sensitivities for Barrier Options with Application to Coco-Bond Calibration

Authors : Thomas Gerstner, Bastian von Harrach, Daniel Roth
Abstract : The Monte Carlo pathwise sensitivities approach is well established for smooth payoff functions. In this work, we present a new Monte Carlo algorithm that is able to calculate the pathwise sensitivities for discontinuous payoff functions. Our main tool is the one-step survival idea of Glasserman and Staum. Although this technique yields to new terms per observation, while differentiating, the algorithm is still efficient. As an application, we use the results for a two-dimensional calibration of a Coco-Bond, which we model with different types of discretely monitored barrier options.