Financial Mathematics

Efficient importance sampling for computing credit value adjustment of interest rate portfolios

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Prior to the financial crises in 2008, the credit risk in derivatives was not appropriately accounted for. Since then there has been an influx of value adjustments to derivative pricing collected under the name of XVA. The counterparty credit risk is this: A bank B trading derivatives with a counterparty C, is subject to the default risk of C. If C defaults at time T and the value of the derivative at that time is $V(T) > 0$ for the bank, then most likely B will not collect the full value of the derivative. The loss is called Lost Given Default LGD. On the other hand if the value is negative then the defaulting C will terminate the contract and use the money in the de-fault. Therefore, at default, there is a asymmetry in the value, and the loss is $LGD * \max(V(T), 0)$. The credit value adjustment (CVA) is the expected loss of the counterparty defaulting before maturity, taking into account net-ting effects. In this talk I will show how to construct efficient importance sampling algorithms for computing the CVA for a portfolio of interest rate derivatives when the short-rate follows a simple one-factor Hall-White model.