

Deep XVA Analysis

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Since the 2008-09 financial crisis, derivative dealers charge to their clients various add-ons, dubbed XVAs, meant to account for counterparty risk and its capital and funding implications for banks. Two competing XVA paradigms are a replication framework and a cost-of-capital, incomplete market approach. Burgard and Kjaer once dismissed an earlier incarnation of the Albanese and Crépey holistic, incomplete market XVA model as being elegant but difficult to solve explicitly. In this talk we show that this model, set on a forward/backward SDE formulation, is not only well-grounded economically, but also able to be solved efficiently using GPU computing combined with machine learning methods in a whole bank balance sheet context. We calculate the mark-to-market cube using GPU computing and the XVA processes using deep learning regression and quantile regression (for the embedded conditional value-at-risk and expected shortfall calculations) schemes.