

BIG DATA & ALGORITHMIC FINANCE



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VOLGAN: A GENERATIVE MODEL FOR ARBITRAGE-FREE IMPLIED VOLATILITY SURFACES

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We introduce VolGAN, a generative model for arbitrage-free implied volatility surfaces. The model is trained on time series of implied volatility surfaces and underlying prices and is capable of generating realistic scenarios for joint dynamics of the implied volatility surface and the underlying asset. We illustrate the performance of the model by training it on SPX implied volatility time series and show that it is able to learn the covariance structure of the co-movements in implied volatilities and generate realistic dynamics for the (VIX) volatility index. In particular, the generative model is capable of simulating scenarios with non-Gaussian distributions of increments for state variables as well as time-varying correlations.

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