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Model independent hedging strategies for variance swaps

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A variance swap is a derivative with a path-dependent payoff which allows investors to take positions on the future variability of an asset. In the idealised setting of a continuously monitored variance swap written on an asset with continuous paths it is well known that the variance swap payoff can be replicated exactly using a portfolio of puts and calls and a dynamic position in the asset. This fact forms the basis of the VIX contract.

But what if we are in the more realistic setting where the contract is based on discrete monitoring, and the underlying asset may have jumps? We show that it is possible to derive model-independent, no-arbitrage bounds on the price of the variance swap, and corresponding sub- and super-replicating strategies. Further, we characterise the optimal bounds. The form of the hedges depends crucially on the kernel used to define the variance swap.

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