Quantitative Finance > Pricing of Securities

Asymptotics and Exact Pricing of Options on Variance

[Martin Keller-Ressel](), [Johannes Muhle-Karbe]()

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We consider the pricing of derivatives written on the discrete realized variance of an underlying security. In the literature, the realized variance is usually approximated by its continuous-time limit, the quadratic variation of the underlying log-price. Here, we characterize the short-time limits of call options on both objects. We find that the difference strongly depends on whether or not the stock price process has jumps. To study the exact valuation of options on the discrete realized variance itself, we then propose a novel approach that allows to apply Fourier-Laplace techniques to price European-style options efficiently. To illustrate our results, we also present some numerical examples.

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