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Discrete nonlinear filtering in finance: Applications to stochastic volatility models with jumps

The estimation of complex financial models such as jump-diffusion models is often performed using sophisticated filtering methods. The discrete nonlinear filter (DNF) provides a deterministic, quick, and flexible alternative to the popular particle filter. Recently, researchers have developed a high-dimensional version of the DNF for jump-diffusion models. In this talk, I outline how the filter is applicable for both frequentist and Bayesian estimation, areas where it is particularly effective compared to alternative approaches (e.g., joint estimation with options and returns data), and its limitations (e.g., models with multiple persistent latent variables). Moreover, I will provide evidence of its effectiveness from simulation studies, empirical results from S&P 500 returns, and a brief overview of the SVDNF R package, which makes the DNF available for returns-only estimation of one-factor stochastic volatility models.