Simultaneous Recovery of Interest and Volatility with Heuristic Parameter Choice

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The classical Black-Scholes option pricing model is a mathematical description of financial market and derivative investment instruments. In its generalized form, prices of options are determined by time dependent volatility and interest. The corresponding inverse problem is to recover interest and volatility from observed noisy option prices. This problem is ill-posed. We employ a regularization approach with two regularization parameters and Tikhonov penalties to show that is possible to stabilize this inverse problem. We further adapt and apply two parameter choice rules to determine the regularization parameters and provide numerical examples.

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