

Inverse problems of financial mathematics

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Financial mathematics is a relatively new field that has grown rapidly in recent years, driven by the emergence of powerful financial markets with various tools for sharing risks among market participants. Changes in the oil market, such as the formation of the OPEC cartel, have forced oil-exporting countries to adapt to new global economic conditions. This has led to significant changes in the scale and complexity of stock markets, where much more money is involved than in the real economy and changes occur much more quickly. Financial mathematics typically assumes that events in the real economy are well-known to market participants, allowing the stock market to be studied separately. It also assumes that market participants have the same level of knowledge, and focuses on managing the risks associated with the uncertain dynamics of financial instruments using secondary financial instruments. The theory of pricing in the market of secondary financial instruments was developed in [1,2].

We consider modified Black-Scholes model of the recovering local volatility functions in the equation [3–5]:

$$u_t = sr(s)u_s + \frac{1}{2}s^2\sigma_1(s)^2\sigma_2(t)^2u_{ss} - r(s)u.$$

It will be presented new numerical methods and an overview of the theoretical results for the inverse problem.

References

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