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17. Control Theory and Optimization

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Methods of Guaranteed Control Theory in Finance

Some problems of financial modelling are formulated and studied in terms and with the help of the theory of guaranteed control under uncertainty with unknown but bounded disturbances [1 – 3]. We consider the portfolio selection problem in dynamics, when expected returns of the risky assets and risk-free rate of return vary with time. Methods of the guaranteed control theory are used to determine the strategy of portfolio management. We also concern the option pricing theory in which guaranteed approach seems to play a crucial role despite stochastic problem formulation. In particular, from this viewpoint some well-known models are considered, and the links between guaranteed and stochastic approaches in financial mathematics are discussed.

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