

Some statistical applications of optional semimartingales

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Abstract. Investigations of the theory of martingales and stochastic calculus without so-called “usual” assumptions on a stochastic basis go back to the works of Dellacherie and Meyer, Lenglart and Galtchouk. They introduced the notion of an optional martingale and constructed the stochastic calculus over such martingales and random measures.

In the framework of applications of this theory in statistics of optional semimartingale-type processes, the strong laws of large numbers, the iterated logarithm laws and the central limit theorems have been obtained by the author during the last two decades. Several additional results with applications of the properties of optional semimartingales are obtained in:

- K. Gasparyan. On a Stochastic Approximation Procedures. Martingale Approach. *Reports of Armenian Academy of Sciences*, vol. 94, no. 2, 1993.
- K. Gasparyan. Rao-Cramer Inequality for General Filtered Statistical Models. *Journal of Contemporary Math. Analysis*, vol. 39, no. 2, 2004.
- K. Gasparyan. Regression Optional Martingale Models. *Proceedings of 11th Iranian Statistical Conference, Tehran, 2012*.
- K. Gasparyan. Asymptotic Normality of the Logarithm of Partial Likelihood Process in Irregular Case. *2nd International Conference – Mathematics in Armenia. Advances and Perspectives, Tsaghkadzor, 2013*.

For an example of application in financial mathematics, we refer to:

- K. Gasparyan. About Uniform Supermartingale Decomposition in Nonstandard Case. *Workshop on Stochastic and PDE Methods in Financial Mathematics, Yerevan, 2012*.