

- **Section number:** 12.
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- **Title: Extremal Behavior of the Heat Random Field**

- **Abstract:**

We study the mean-square solution of the multidimensional heat equation with random initial conditions (the heat random field).

We present the exponential type inequality for the distribution of the supremum of the heat random field. We consider initial conditions as a class of strictly sub-Gaussian random fields, which permit us to employ the Orlicz space technique. For the Gaussian case the similar results can be found in Kozachenko and Leonenko [2].

This results are strongly based on the important development by Cramer, Leadbetter, Fernique, Borel, Adler, Piterbarg, Talagrand.

In fact we use a spectral theory of random fields to present the solution of the heat equation and its covariance function in more convenient way to estimate the modulus of continuity. Also we use the Orlicz space technique which was developed by Buldigin and Kozachenko [1].

**References:**

1. Buldygin, V. V. and Kozachenko, Yu, V.: Metric Characterization of Random Variables and Random Processes. Translations of Mathematical Monograph, vol.188 American Mathematical Society, Providence (2000).
2. Kozachenko, Yu. V. and Leonenko, G.M.: Large deviations type inequality for the supremum of the heat random field, *Method of Functional Analysis and Topology*, **8**, N 3, 46-49 (2002).
3. Kozachenko, Yu. V. and Leonenko, G.M.: Extremal Behavior of the Heat Random Field, submitted in *Extremes*, (2003).

- **Subject classification:** 60 G 60, 60 G 70.
- **Key words:** heat equation, random initial condition, sub-Gaussian random field, distribution of supremum, exponential inequality, Orlicz spaces technique