

ABSTRACT

Theme: “Limit theorems for local times of integer-valued random walks”

Master diploma: 108 p., 2 illustrations, 1 appendix, 17 bibliographic references.

The object of study – multidimensional integer random walks and moments of their return to zero.

Purpose of the study – limit theorems for the number of returns to zero of multidimensional integer walks and related variables.

The aim - to build limit distributions of the number of returns to zero for diagonal random walk in two-dimensional time.

The paper considers the return of symmetric integer three dimensional random walk process on the coordinate axis and to the main diagonal and also return to zero of diagonal two dimensional random walk. The marginal distributions for normalized sequence of number returns were built for a given set of processes returns and some other asymptotic properties were proved.

Similar asymptotic theorems are widely studied for simple symmetric random walk - walk with distribution with $P \{ \xi = \pm 1 \} = 1/2$. In this master's thesis there was received a significant generalization of known results for the case of symmetric integer random walk processed with finite step. The results of work found that the marginal distribution of return for three dimensional random walk on the coordinate axis and to main diagonal is exponential, and for the return to diagonal of two dimensional random walk takes place almost certain convergence to a constant.

Practical application - construction of interval estimates of unknown parameter distribution step random walk in frequency of visits to a given subset of states.

RANDOM WALK, SUBSET OF STATES, RETURN PROCESS, PROBABILITY OF RETURN, TIME OF FIRST RETURN, LIMIT DISTRIBUTION.