ASYMPTOTIC BEHAVIOR OF RENEWAL SETS

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Let $\{X(m,n)\}$ be a family of independent identically distributed random variables and let

$$S(m,n) = \sum_{k=1}^{m} \sum_{l=1}^{n} X(k,l)$$

be their rectangular (double) sums depending on two parameters. We present some results like the strong law of large numbers on the asymptotic evolution of the following random sets in $\mathbf{R}^2$

$$R(x) = \{(m,n) : S(m,n) < x\}, \qquad x > 0,$$

and describe the almost sure limits. In particular, we investigate the limit behavior of the so-called *renewal function*

$$\mathrm{card}\{R(x)\} = \mathrm{card}\{(m,n) : S(m,n) < x\}, \qquad x \to \infty.$$

The latter problem is related to those discussed in [1].

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References

[1] V. V. Buldygin, K.-H. Indlekofer, O. I. Klesov, and J. G. Steinebach *Pseudo-Regularly Varying Functions and Generalized Renewal Processes*, TBiMC, Kiev, 2012, 442 pp. (in Ukrainian)

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