

Renewal theorems for some weighted renewal functions

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Joint results of Indlekofer, Klesov and myself is presented.

Let $X, X_1, X_2, \dots$ be a family of integer valued, independent and identically distributed random variables, $0 < \mu = EX$, $\sigma^2 = E(X - \mu)^2$. Let $S_n = X_1 + \dots + X_n$, $R(k) = \sum_{n=1}^{\infty} a_n P(S_n = k)$, $a_n \geq 0$, $a_n = O(n^\varepsilon)$. Assume that for $A(x) = \sum_{n \leq x} a_n$ the condition $c_1 h L(x) \leq A(x+h) - A(x) \leq c_2 h L(x)$, $c_3 \leq \frac{L(h)}{L(x)} \leq c_4$ hold with $L(x) \geq 1$ ($x \geq 1$) and $\sqrt{x} \leq h \leq x$.

The asymptotic of $R(k)$ is given under some special, arithmetically characterized choice of a_n .