Lengyel, T.

On the divisibility by 2 of the Stirling numbers of the second kind. (English) Zbl 0808.11017

Fibonacci Q. 32, No. 3, 194-201 (1994).

Summary: We characterize the divisibility by 2 of the Stirling numbers of the second kind, $S(n,k)$, where n is a sufficiently high power of 2. Let $\nu_2(r)$ denote the highest power of 2 that divides r. We show that there exists a function $L(k)$ such that, for all $n \geq L(k)$, $\nu_2(k!S(2^n,k)) = k-1$ hold, independently from n. (The independence follows from the periodicity of the Stirling numbers modulo any prime power.) For $k \geq 5$, the function $L(k)$ can be chosen so that $L(k) \leq k-2$. We determine $\nu_2(k!S(2^n+u,k))$ for $k > u \geq 1$, in particular for $u = 1$, 2, 3, and 4. We show how to calculate it for negative values, in particular for $u = -1$. The characterization is generalized for $\nu_2(k!S(c \cdot 2^n + u, k))$, where $c > 0$ denotes an arbitrary odd integer.

MSC:

11B73 Bell and Stirling numbers

11B50 Sequences (mod m)

Keywords:

divisibility; Stirling numbers of the second kind; periodicity