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2-adic Pictures of a Sequence Arising from a Rational Integral

In the study of the rational integral

$$N_{0,4}(a;m) := \int_0^\infty \frac{dx}{(x^4+2ax^2+1)^{m+1}}$$

We found the sequence

$$d_l(m) := 2^{-2m} \sum_{k=l}^{m} 2^k \binom{2m-2k}{m-k} \binom{m+k}{k} \binom{k}{l}.$$

The study of the 2-adic valuation of $\{d_l(m) : 0 \le l \le m\}$*, lead us to consider the arithmetical properties of Stirling numbers of the second kind. We present some preliminary results of this problem.*