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Abstract. Let $\{a_1, a_2, \ldots, a_n, \ldots\}$ be a sequence of complex numbers which has at most polynomial growth and satisfies an extra assumption. In this talk, inspired by a recent work of Sasane, we give an explanation of the sum

$$a_1 + 2a_2 + 3a_3 + \cdots + na_n + \cdots,$$

and more generally, for any $k \in \mathbb{N}$, the sum

$$1^k a_1 + 2^k a_2 + 3^k a_3 + \cdots + n^k a_n + \cdots,$$

from the viewpoint of distributions. As applications, we explain the following summation formulas

$$1^k - 2^k + 3^k - \cdots = -\frac{E_k(0)}{2},$$

$$1^k + 2^k + 3^k + \cdots = -\frac{B_{k+1}}{k+1},$$

$$c^1 1^k + c^2 2^k + c^3 3^k + \cdots = -\frac{B_{k+1}(c)}{k+1},$$

where $E_k(0)$, B_k and $B_k(c)$ are the Euler polynomials at 0, the Bernoulli numbers and the Apostol–Bernoulli numbers, respectively.

This is a joint work with Prof. Min-Soo Kim (Hyungnam University).