LINEAR RECURSIVE RELATIONS FOR BERNOULLI NUMBERS AND APPLICATIONS

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Abstract: This study concerns a new approach of Bernoulli numbers B_n and Bernoulli numbers $B_n^{(k)}$ of order $k \geq 2$, using properties of some linear recursive relations of infinite order. Linear recursive relations for generating B_n and $B_n^{(k)}$ are established and some identities are provided. Moreover, linear, combinatorial and analytic approaching processes of B_n and $B_n^{(k)}$ are proposed. The closed connection with partial Bell polynomials is considered. Finally, applications to Genocchi numbers G_n, Euler numbers E_n and zeta function $\zeta(n)$ are discussed.

Keywords and Phrases: Linear recursive relations of infinite order, ∞-generalized Fibonacci sequences, Bernoulli numbers, Combinatorial formula, Approximation processes, Genocchi numbers, Euler numbers, zeta function, partial Bell polynomials.

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