

GENERALIZATIONS OF BERNOULLI NUMBERS AND POLYNOMIALS

QIU-MING LUO, BAI-NI GUO, FENG QI,
and LOKENATH DEBNATH

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The concepts of Bernoulli numbers B_n , Bernoulli polynomials $B_n(x)$, and the generalized Bernoulli numbers $B_n(\alpha, b)$ are generalized to the one $B_n(x; \alpha, b, c)$ which is called the generalized Bernoulli polynomials depending on three positive real parameters. Numerous properties of these polynomials and some relationships between B_n , $B_n(x)$, $B_n(\alpha, b)$, and $B_n(x; \alpha, b, c)$ are established.

2000 Mathematics Subject Classification: 11B68, 33E20.

1. Introduction. It is well known that Bernoulli's numbers and polynomials play important roles in mathematics. They are main objects in the theory of special functions [5]. Their definitions can be given as follows.

DEFINITION 1.1. The numbers B_n , $0 \leq n \leq \infty$, are called Bernoulli numbers if

$$\phi(t) = \frac{t}{e^t - 1} = \sum_{n=0}^{\infty} \frac{B_n}{n!} t^n, \quad |t| < 2\pi. \quad (1.1)$$

DEFINITION 1.2. The functions $B_n(x)$, $0 \leq n \leq \infty$, are called Bernoulli polynomials if they satisfy

$$\phi(x; t) = \frac{t e^{xt}}{e^t - 1} = \sum_{n=0}^{\infty} \frac{B_n(x)}{n!} t^n, \quad |t| < 2\pi, \quad x \in \mathbb{R}. \quad (1.2)$$

The usual definition of higher-order Bernoulli polynomials is

$$\frac{t^\sigma e^{xt}}{(e^t - 1)^\sigma} = \sum_{n=0}^{\infty} \frac{B_n^\sigma(x)}{n!} t^n, \quad |t| < 2\pi. \quad (1.3)$$

In [2, 4] the second and third authors generalized the concept of Bernoulli numbers as follows.

A Generalization Of The Bernoulli Numbers

SJ Ball



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In a digital era where connections and knowledge reign supreme, the enchanting power of language has been apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**A Generalization Of The Bernoulli Numbers**," compiled by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we shall delve into the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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