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**Bernoulli Numbers And Zeta  
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The main one is the theory of Bernoulli numbers and the other is the theory of zeta functions. Historically, Bernoulli numbers were introduced to give formulas for the sums of powers of

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consecutive integers. The real reason that they are indispensable for number theory, however, lies in the fact that special values of the Riemann zeta function can be written by using Bernoulli numbers.

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## Springer Monographs In Mathematics **Bernoulli Numbers and Zeta Functions | Tsuneo Arakawa ...**

The Bernoulli numbers can be expressed in terms of the Riemann zeta function: .

$B_n = -n\zeta(1-n)$  for  $n \geq 1$  .. Here the argument of the zeta function is 0 or negative. By means of the zeta functional equation and the gamma reflection formula the following relation



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can be obtained (Arfken 1970, p. 279): =  $(-1)^n B_n / n!$  for  $n \geq 1$ . Now the argument of the zeta function is positive.

## **Bernoulli number - Wikipedia**

Several properties and generalizations of Bernoulli numbers, and various relations to the Riemann zeta function and some other zeta functions are discussed. In

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Chapter 1, authors review the history of Bernoulli numbers and study two equivalent definitions and some basic properties of these numbers.

## **Bernoulli Numbers and Zeta Functions | Mathematical ...**

Published 2013/9/15. Bernoulli numbers are the coefficients of the formula of a

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sum of powers of natural numbers. For example, a formula of a sum of natural numbers can be expressed by two Bernoulli numbers. Zeta function can be expressed by these Bernoulli numbers. Zeta function.

## **Zeta function and Bernoulli numbers - Mysterious World of ...**

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Zeta Function B Sury Introduction B Sury  
is with the Indian Statistical Institute. He  
introduces this article by: Bernoulli truly  
stunned us with his number; woke us up  
from a deep and ignorant slumber. Its  
relation with Riemann zeta makes us  
think nothing could be better.

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## Springer Monographs In Mathematics **Bernoulli numbers and the riemann zeta function**

The Bernoulli numbers  $B_n$  are a sequence of signed rational numbers that can be defined by the exponential generating function  $x/(e^x-1)=\sum_{n=0}^{\infty}(B_n x^n)/(n!)$ . (1) These numbers arise in the series expansions of trigonometric functions, and are

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extremely important in number theory and analysis. There are actually two definitions for the Bernoulli numbers.

## **Bernoulli Number -- from Wolfram MathWorld**

In mathematics, the Bernoulli polynomials, named after Jacob Bernoulli, combine the Bernoulli

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numbers and binomial coefficients. They are used for series expansion of functions, and with the Euler-MacLaurin formula.. These polynomials occur in the study of many special functions and, in particular the Riemann zeta function and the Hurwitz zeta function.

## **Bernoulli polynomials - Wikipedia**

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That Bernoulli numbers are firmly embedded in analytic number theory is guaranteed by their relationship to reciprocal power sums, otherwise known as values of the Riemann Zeta function. Half of this relationship was already known to Euler.

## **Bernoulli numbers and the unity of**



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Bernoulli numbers, which are ubiquitous in mathematics, typically appear either as the Taylor coefficients of  $x = \tan x$  or else, very closely related to this, as special values of the Riemann zeta function. But they also sometimes appear in other guises and in other combinations.

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## **Appendix Curious and Exotic Identities for Bernoulli Numbers**

The Riemann zeta function and Bernoulli numbers 1 Bernoulli numbers and power sums Last time we observed that the exponential generating function for the power sums was expressed in terms of Bernoulli numbers. More precisely, if

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$k > 0$ , then  $S$

**The Riemann zeta function and  
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Historically, Bernoulli numbers were introduced to give formulas for the sums of powers of consecutive integers. The real reason that they are indispensable for number theory, however, lies in the

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## **Bernoulli Numbers and Zeta Functions | SpringerLink**

We construct and study a certain zeta

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function which interpolates multi-poly-Bernoulli numbers at nonpositive integers and whose values at positive integers are linear combinations of multiple zeta values. This function can be regarded as the one to be paired up with the  $\zeta_{\text{poly}}$ -function defined by Arakawa and Kaneko.

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**MULTI-POLY-BERNOULLI NUMBERS  
AND RELATED ZETA FUNCTIONS ...**

MULTIPLE ZETA VALUES, POLY-  
BERNOULLI NUMBERS, AND RELATED  
ZETA FUNCTIONS TSUNEO ARAKAWA  
and MASANOBU KANEKO Abstract. We  
study the function  $(k_1; \dots; k_n; s) = \sum_{0 < m_1 < m_2 < \dots < m_n} \frac{1}{k_1 m_1 + k_2 m_2 + \dots + k_n m_n + s}$

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s n and show that the poly-Bernoulli numbers introduced in our previous paper are expressed as special values at negative arguments of certain ...

## **MULTIPLE ZETA VALUES, POLY-BERNOULLI NUMBERS, AND RELATED ...**

Abstract We construct and study a



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certain zeta function which interpolates multi-poly-Bernoulli numbers at non-positive integers and whose values at positive integers are linear combinations of multiple zeta values. This function can be regarded as the one to be paired up with the  $\xi$ -function defined by Arakawa and the first-named author.

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**Multi-poly-Bernoulli numbers and  
related zeta functions**

zeta function which connects poly-Bernoulli numbers with the so-called multiple zeta values, the subject of wide interest not only in number theory but also in numerous other branches such as topology, quantum groups, arithmetic geome-

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**Poly-Bernoulli numbers and related  
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Historically, Bernoulli numbers were introduced to give formulas for the sums of powers of consecutive integers. The real reason that they are indispensable for number theory, however, lies in the fact that special values of the Riemann

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