Adelberg, Arnold

Congruences of p-adic integer order Bernoulli numbers. (English) Zbl 0866.11013

J. Number Theory 59, No. 2, 374-388 (1996); erratum 65, No. 1, 179 (1997).

The p-adic integer order Bernoulli numbers $B_n^{(p)}$ of the title are defined by

$$\left(\frac{t}{e^t-1}\right)^p \cdot e^{xt} = \sum_{n=0}^{\infty} B_n^{(p)}(x) \cdot \frac{t^n}{n!},$$

with $B_n^{(p)} = B_n^{(p)}(0)$, where p is an arbitrary p-adic integer. In this very well-written paper the author proves some new congruences for $B_n^{(p)}$. These generalize e.g. the classical Kummer congruences for ordinary Bernoulli numbers. Several results by F. T. Howard or L. Carlitz are also extended.

The congruences (which are too complicated to be stated here) have ramifications for the Stirling numbers of the first and second kind. These are consequences of irreducibility theorems on certain Bernoulli polynomials of order divisible by p, as an application of the very general congruence properties obtained by the author for $B_n^{(p)}$ and related numbers.

In the Erratum a correct statement of Theorem 1 (iii) is given as well as two minor misprint corrections.

Reviewer: József Sándor (Jud.Harghita)

MSC:

11B68	Bernoulli and Euler numbers and polynomials
11S80	Other analytic theory (analogues of beta and gamma functions, p-adic integration, etc.)

Keywords:

p-adic analysis; Bernoulli polynomials of higher order; irreducibility theorems; p-adic integer order Bernoulli numbers; congruences; Stirling numbers

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