

**Zudilin, Wadim**

**Congruences for  $q$ -binomial coefficients.** (English) Zbl 1431.11032  
*Ann. Comb.* 23, No. 3-4, 1123-1135 (2019).

Summary: We discuss  $q$ -analogues of the classical congruence  $\binom{ap}{bp} \equiv \binom{a}{b} \pmod{p^3}$ , for primes  $p > 3$ , as well as its generalisations. In particular, we prove related congruences for ( $q$ -analogues of) integral factorial ratios.

**MSC:**

**11B65** Binomial coefficients; factorials;  $q$ -identities  
**05A10** Factorials, binomial coefficients, combinatorial functions  
**11A07** Congruences; primitive roots; residue systems

Cited in **31** Documents

**Keywords:**

congruence;  $q$ -binomial coefficient; cyclotomic polynomial; radial asymptotics

**Full Text:** [DOI](#) [arXiv](#)

**References:**

- [1] Adamczewski, B., Bell, J.P., Delaygue, É., Jouhet, F.: Congruences modulo cyclotomic polynomials and algebraic independence for  $\mathbb{Q}$ -series. *Sém. Lothar. Combin.* 78B, #A54 (2017) · [Zbl 1405.11019](#)
- [2] Andrews, Ge,  $\mathbb{Q}$ -Analogues of the binomial coefficient congruences of Babbage, Wolstenholme and Glaisher. *Discrete Math.*, 204, 1-3, 15-25 (1999) · [Zbl 0937.05014](#) · [doi:10.1016/S0012-365X\(98\)00364-1](#)
- [3] Andrews, Ge; Askey, R.; Roy, R., *Special Functions* (1999), Cambridge: Cambridge University Press, Cambridge
- [4] Gorodetsky, O.,  $\mathbb{Q}$ -Congruences, with applications to supercongruences and the cyclic sieving phenomenon, *Intern. J. Number Theory*, 15, 9, 1919-1968 (2019) · [Zbl 1423.11043](#) · [doi:10.1142/S1793042119501069](#)
- [5] Guo, Vjw; Zudilin, W., A  $\mathbb{Q}$ -microscope for supercongruences, *Adv. Math.*, 346, 329-358 (2019) · [Zbl 1464.11028](#) · [doi:10.1016/j.aim.2019.02.008](#)
- [6] Meštrović, R.: Wolstenholme's theorem: its generalizations and extensions in the last hundred and fifty years (1862-2012). [arXiv:1111.3057](#) (2011)
- [7] Pan, H., Factors of some lacunary  $\mathbb{Q}$ -binomial sums, *Monatsh. Math.*, 172, 4, 387-398 (2013) · [Zbl 1371.11044](#) · [doi:10.1007/s00605-013-0515-0](#)
- [8] Straub, A.: A  $\mathbb{Q}$ -analog of Ljunggren's binomial congruence. In: *DMTCS Proceedings: 23rd International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2011)*, *Discrete Math. Theor. Comput. Sci. Proc.*, AO, pp. 897-902. Assoc. Discrete Math. Theor. Comput. Sci., Nancy (2011) · [Zbl 1355.05053](#)
- [9] Straub, A., Supercongruences for polynomial analogs of the Apéry numbers, *Proc. Amer. Math. Soc.*, 147, 3, 1023-1036 (2019) · [Zbl 1442.11039](#) · [doi:10.1090/proc/14301](#)
- [10] Warnaar, So; Zudilin, W., A  $\mathbb{Q}$ -rious positivity, *Aequationes Math.*, 81, 1-2, 177-183 (2011) · [Zbl 1234.11023](#) · [doi:10.1007/s00010-010-0055-9](#)

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