

## ON $p$ -ADIC INTERPOLATING FUNCTION ASSOCIATED WITH MODIFIED DIRICHLET'S TYPE OF TWISTED $q$ -EULER NUMBERS AND POLYNOMIALS WITH WEIGHT $\alpha$

SERKAN ARACI, MEHMET ACIKGOZ AND HASSAN JOLANY

**Abstract.** In the present paper, we introduce modified Dirichlet's type of twisted  $q$ -Euler polynomials with weight  $\alpha$ . We apply the method of generating function and  $p$ -adic  $q$ -integral representation on  $\mathbb{Z}_p$ , which are exploited to derive further classes of  $q$ -Euler numbers and polynomials. Our new generating function possess a number of interesting properties which we state in this paper.

**Mathematics subject classification (2010):** 05A10, 11B65, 28B99, 11B68, 11B73.

**Keywords and phrases:** Euler numbers and polynomials,  $q$ -Euler numbers and polynomials, Modified twisted  $q$ -Euler numbers and polynomials with weight  $\alpha$ , Modified Dirichlet's type twisted  $q$ -Euler numbers and polynomials with weight  $\alpha$ .

## REFERENCES

- [1] S. ARACI, M. ACIKGOZ AND J. J. SEO, *Explicit formulas involving  $q$ -Euler numbers and polynomials*, Abstract and Applied Analysis, Volume 2012, Article ID 298531, 11 pages.
- [2] E. CETIN, M. ACIKGOZ, I. N. CANGUL AND S. ARACI, *A note on the  $(h, q)$ -Zeta-type function with weight  $\alpha$* , Journal of Inequalities and Applications 2013, 2013:100.
- [3] I. N. CANGUL, H. OZDEN, Y. SIMSEK, *Generating functions of the  $(h, q)$  extension of twisted Euler polynomials and numbers*, Acta Math. Hungar. 120 (2008), no. 3, 281–299.
- [4] T. KIM, *A New Approach to  $q$ -Zeta Function*, J. Comput. Anal. Appl. 9 (2007), 395–400.
- [5] T. KIM,  *$q$ -Volkenborn integration*, Russ. J. Math. phys. 9 (2002), 288–299.
- [6] T. KIM, *An invariant  $p$ -adic  $q$ -integrals on  $\mathbb{Z}_p$* , Applied Mathematics Letters, vol. 21, pp. 105–108, 2008.
- [7] T. KIM,  *$q$ -Euler numbers and polynomials associated with  $p$ -adic  $q$ -integrals*, J. Nonlinear Math. Phys., 14 (2007), no. 1, 15–27.
- [8] T. KIM, *New approach to  $q$ -Euler polynomials of higher order*, Russ. J. Math. Phys., 17 (2010), no. 2, 218–225.
- [9] T. KIM AND S.-H. RIM, *On the twisted  $q$ -Euler numbers and polynomials associated with basic  $q$ - $l$ -functions*, Journal of Mathematical Analysis and Applications, vol. 336, no. 1, pp. 738–744, 2007.
- [10] T. KIM, J.-S. CHO, *A note on multiple Dirichlet's  $q$ -L-function*, Adv. Stud. Contemp. Math. (Kyungshang) 11 (1) (2005), 57–60.
- [11] D. V. DOLGY, T. KIM, S. H. LEE, B. LEE AND S.-H. RIM, *A note on the modified  $q$ -Bernoulli numbers and polynomials with weight  $\alpha$* , Abstract and Applied Analysis 2011, Article ID 545314 (2011).
- [12] M.-S. KIM, T. KIM, J.-W. SON, *On multiple twisted  $p$ -adic  $q$ -Euler  $\zeta$ -functions and L-functions*, Abstr. Appl. Anal. (2008), Art. ID 793297, 14 pp.
- [13] T. KIM, *A new approach to  $p$ -adic  $q$ -L-functions*, Adv. Stud. Contemp. Math. (Kyungshang) 12 (2006), no. 1, 61–72.
- [14] S.-H. RIM AND J. JEONG, *A note on the modified  $q$ -Euler numbers and polynomials with weight  $\alpha$* , Int. Math. Journal, Vol. 6, 2011, no. 65, 3245–3250.
- [15] H. OZDEN,  *$q$ -Dirichlet type L-functions with weight  $\alpha$* , Adv. Dif. Equ. 2013, 2013:40.

- [16] L.-C. JANG, *On a  $q$ -analogue of the  $p$ -adic generalized twisted  $L$ -functions and  $p$ -adic  $q$ -integrals*, Journal of the Korean Mathematical Society, vol. 44, no. 1, pp. 1–10, 2007.
- [17] Y. SIMSEK, *Theorems on twisted  $L$ -function and twisted Bernoulli numbers*, Advan. Stud. Contemp. Math., 11 (2005), 205–218.
- [18] Y. SIMSEK, *Twisted  $(h, q)$ -Bernoulli numbers and polynomials related to twisted  $(h, q)$ -zeta function and  $L$ -function*, J. Math. Anal. Appl., 324 (2006), 790–804.
- [19] Y. SIMSEK, *On  $p$ -adic twisted  $q$ - $L$ -functions related to generalized twisted Bernoulli numbers*, Russian J. Math. Phys., 13 (3) (2006), 340–348.
- [20] Y. SIMSEK AND H. M. SRIVASTAVA, *A family of  $p$ -adic twisted interpolation functions associated with the modified Bernoulli numbers*, Appl. Math. Comp. 216 (2010), 2976–2987.
- [21] H. M. SRIVASTAVA, *Some generalizations and basic (or  $q$ -) extensions of the Bernoulli, Euler and Genocchi polynomials*, Appl. Math. Inform. Sci. 5 (2011), 390–444.
- [22] H. M. SRIVASTAVA AND J. CHOI, *Zeta and  $q$ -Zeta Functions and Associated Series and Integrals*, Elsevier Science Publishers, Amsterdam, London and New York, 2012.
- [23] H. M. SRIVASTAVA, T. KIM, AND Y. SIMSEK,  *$q$ -Bernoulli numbers and polynomials associated with multiple  $q$ -zeta functions and basic  $L$ -series*, Russian J. Math. Phys. 12 (2005), 241–268.
- [24] L.-C. WASHINGTON, *Introduction to cyclotomic fields*, Second edition, Springer-Verlag, 1997.
- [25] H. TSUMURA, *On a  $p$ -adic interpolation of the generalized Euler numbers and its applications*, Tokyo J. Math. 10 (2) (1987) 281–293.