

COEFFICIENT INEQUALITIES FOR CERTAIN CLASSES OF
ANALYTIC FUNCTIONS USING q -DERIVATIVES

S.VARADHARAJAN, C. SELVARAJ, and K. R. KARTHIKEYAN

Abstract. We introduce and we study the classes $\mathcal{ST}_q(g, \lambda, \gamma, \alpha, \beta)$ and $\mathcal{KV}_q(g, \lambda, \gamma, \alpha, \beta)$ of analytic functions which are defined by making use of the q -derivative operator. Coefficient inequalities for functions in these classes are discussed. Some interesting consequences of the results are also pointed out.

MSC 2010. 30C45; 30C50.

Key words. Analytic function, univalent function, starlike function, convex function, convolution, q -derivative operator.

REFERENCES

- [1] M. Abramowitz and I.A. Stegun, *Handbook of mathematical functions with formulas, graphs, and mathematical tables*, Dover Publications Inc., New York, 1965.
- [2] R. Aghalary and Gh. Azadi, *The Dziok-Srivastava operator and k -uniformly starlike functions*, J. Inequal. Pure Appl. Math., **6** (2005), Article 52, 1–7.
- [3] H. Alzer, *Error function inequalities*, Adv. Comput. Math., **33** (2010), 3, 349–379.
- [4] E. Aqlan, J.M. Jahangiri, and S. R. Kulkarni, *Classes of k -uniformly convex and starlike functions*, Tamkang J. Math., **35** (2004), 3, 1–7.
- [5] A. Aral, V. Gupta and R.P. Agarwal, *Applications of q -calculus in operator theory*, Springer, New York, 2013.
- [6] R. Bharati, R. Parvatham and A. Swaminathan, *On subclasses of uniformly convex functions and corresponding class of starlike functions*, Tamkang J. Math., **28** (1997), 1, 17–32.
- [7] L. Carlitz, *The inverse of the error function*, Pacific J. Math., **13** (1963), 459–470.
- [8] M.A. Chaudhry, A. Qadir and S.M. Zubair, *Generalized error functions with applications to probability and heat conduction*, Int. J. Appl. Math., **9** (2002), 3, 259–278.
- [9] D. Coman, *The radius of starlikeness for the error function*, Stud. Univ. Babeş-Bolyai Math., **36** (1991), 2, 13–16.
- [10] Á. Elbert and A. Laforgia, *The zeros of the complementary error function*, Numer. Algorithms, **49** (2008), 1–4, 153–157.
- [11] A.W. Goodman, *On uniformly convex functions*, Ann. Polon. Math., **56** (1991), 1, 87–92.
- [12] A.W. Goodman, *On uniformly starlike functions*, J. Math. Anal. Appl., **155** (1991), 2, 364–370.

The authors thank the referee for his helpful comments and suggestions.

- [13] G. Herden, *The role of error-functions in order to obtain relatively optimal classification*, in *Classification and related methods of data analysis (Aachen, 1987)*, 105–111, North-Holland, Amsterdam, 1987.
- [14] F.H. Jackson, *On q -definite integrals*, The Quarterly Journal of Pure and Applied Mathematics, **41** (1910), 193–203.
- [15] F.H. Jackson, *On q -functions and a certain difference operator*, Transactions of the Royal Society of Edinburgh, **46** (1908), 253–281.
- [16] S. Kanas and D. Răducanu, *Some class of analytic functions related to conic domains*, Math. Slovaca, **64** (2014), 5, 1183–1196.
- [17] W.C. Ma and D. Minda, *Uniformly convex functions*, Ann. Polon. Math., **57** (1992), 165–175.
- [18] A. Mohammed and M. Darus, *A generalized operator involving the q -hypergeometric function*, Mat. Vesnik, **65** (2013), 4, 454–465.
- [19] M. Arif, J. Sokół and M. Ayaz, *Coefficient inequalities for a subclass of p -valent analytic functions*, Sci. World J., **5** (2014), Article 801751, 1–5.
- [20] S. Owa, Y. Polatoğlu and E. Yavuz, *Coefficient inequalities for classes of uniformly starlike and convex functions*, J. Inequal. Pure Appl. Math., **7** (2006), 5, Article 160, 1–5.
- [21] S.D. Purohit, *A new class of multivalently analytic functions associated with fractional q -calculus operators*, Fract. Differ. Calc., **2** (2012), 2, 129–138.
- [22] S.D. Purohit and R.K. Raina, *Certain subclasses of analytic functions associated with fractional q -calculus operators*, Math. Scand., **109** (2011), 1, 55–70.
- [23] S.D. Purohit and R.K. Raina, *Fractional q -calculus and certain subclasses of univalent analytic functions*, Mathematica **55(78)** (2013), 1, 62–74.
- [24] C. Ramachandran, D. Kavitha and T. Soupramanien, *Certain bound for q -starlike and q -convex functions with respect to symmetric points*, Int. J. Math. Math. Sci., **2015**, Article 205682, 1–7.
- [25] C. Ramachandran, L. Vanitha and S. Kanas, *Certain results on q -starlike and q -convex error functions*, Math. Slovaca, **68** (2018), 2, 361–368.
- [26] M.I.S. Robertson, *On the theory of univalent functions*, Ann. of Math., **37** (1936), 2, 374–408.
- [27] S. Shams, S.R. Kulkarni and J.M. Jahangiri, *Classes of uniformly starlike and convex functions*, Int. J. Math. Math. Sci., **2004**, 53–56, 2959–2961.

Received April 11, 2019

Accepted October 16, 2019

Al Musanna College of Technology
Department of Information Technology
Mathematics Section
Muscat, Sultanate of Oman
E-mail: svrajanram@gmail.com

Presidency College (Autonomous)
Department of Mathematics
Chennai, Tamilnadu, India
E-mail: pamc9439@yahoo.co.in

National University of Science and Technology
Department of Applied Mathematics and Science
Muscat, Sultanate of Oman
E-mail: kr_karthikeyan1979@yahoo.com