

COEFFICIENT INEQUALITIES FOR SUBCLASSES OF  
ANALYTIC FUNCTIONS BASED ON QUASI-SUBORDINATION  
AND MAJORIZATION RELATED WITH SIGMOID FUNCTIONS

LAKSHMINARAYANAN VANITHA, CHELLAKUTTI RAMACHANDRAN,  
GANGADHARAN MURUGUSUNDARAMOORTHY, and HALIT ORHAN

*Dedicated to Prof. Dr. Hari Mohan Srivastava on the occasion of his 80th birthday.*

**Abstract.** In the present paper, we estimate the coefficient bounds for certain subclasses of the starlike and convex functions using quasi-subordination and majorization relating with sigmoid functions.

**MSC 2010.** 30C45, 30C50, 33E99.

**Key words.** Univalent function, subordination, quasi-subordination, majorization.

REFERENCES

- [1] O. Altıntaş and S. Owa, *Majorizations and quasi-subordinations for certain analytic functions*, Proc. Japan Acad. Ser. A Math. Sci., **68** (1992), 181–185.
- [2] P.L. Duren, *Univalent Functions*, Grundlehren der Mathematischen Wissenschaften, Vol. **259**, Springer, New York, 1983.
- [3] R. El-Ashwah and S. Kanas, *Fekete-Szegő Inequalities for Quasi-Subordination Functions Classes of Complex Order*, Kyungpook Math. J., **55** (2015), 679–688.
- [4] O.A. Fadipe-Joseph, A.T. Oladipo and U.A. Ezeafulukwe, *Modified sigmoid function in univalent function theory*, Int. J. Math. Sciences Appl., **7** (2013), 313–317.
- [5] P. Gurusamy, J. Sokól and S. Sivasubramanian, *The Fekete-Szegő functional associated with  $k$ -th root transformation using quasi-subordination*, C. R. Math. Acad. Sci. Paris, **353** (2015), 617–622.
- [6] M. Haji Mohd and M. Darus, *Fekete-Szegő problems for quasi-subordination classes*, Abstr. Appl. Anal., **2012**, Article ID192956, 1–14.
- [7] F.R. Keogh and E.P. Merkes, *A coefficient inequality for certain classes of analytic functions*, Proc. Amer. Math. Soc., **20** (1969), 8–12.
- [8] W.C. Ma and D. Minda, *A unified treatment of some special classes of univalent functions*, in *Proceedings of the Conference on Complex Analysis*, Tianjin, 1992, International Press, Cambridge, 1994, pp. 157–169.
- [9] G. Murugusundaramoorthy and T. Janani, *Sigmoid function in the space of univalent  $\lambda$ -pseudo starlike functions*, Int. J. Math. Sciences Appl., **101** (2015), 33–41.
- [10] Z. Nehari, *Conformal Mappings*, McGraw-Hill, New York, 1952.

---

The corresponding author is Halit Orhan. The authors thank the referee for his helpful comments and suggestions.

- [11] S.O. Olatunji, *Sigmoid function in the space of univalent  $\lambda$ -pseudo starlike function with Sakaguchi type functions*, Journal of Progressive Research in Mathematics, **7** (2016), 1164–1172
- [12] S.O. Olatunji and E.J. Dansu, *Coefficient estimates for Bazilevic Ma-Minda functions in the space of sigmoid function*, Malaya J. Mat., **4** (2016), 505–512.
- [13] S.O. Olatunji, E.J. Dansu and A. Abidemi, *On a Sakaguchi type class of analytic functions associated with-quasi subordination in the space of modified sigmoid functions*, Electron. J. Math. Anal. Appl., **5** (2017), 97–105.
- [14] C. Ramachandran, L. Vanitha and S. Kanas, *Certain results on  $q$ -starlike and  $q$ -convex error functions*, Math. Slovaca, **68** (2018), 361–368.
- [15] M. S. Robertson, *Quasi-subordination and coefficient conjectures*, Bull. Amer. Math. Soc., **76** (1970), 1–9.

Received September 3, 2020

Accepted February 11, 2021

*Anna University*  
*University College of Engineering*  
*Department of Mathematics*  
*Villupuram-605 103, Tamilnadu, India*  
*E-mail: swarna.vanitha@gmail.com*  
<https://orcid.org/0000-0002-4044-8382>  
*E-mail: crjssp2004@yahoo.com*  
<https://orcid.org/0000-0003-0795-0650>

*Vellore Institute of Technology*  
*School of Advanced Sciences*  
*Vellore – 632014, Tamilnadu, India*  
*E-mail: gmsmoorthy@yahoo.com*  
<https://orcid.org/0000-0001-8285-6619>

*Atatürk University*  
*Faculty of Science*  
*Department of Mathematics*  
*Erzurum, Turkey*  
*E-mail: orhanhalit607@gmail.com*  
<https://orcid.org/0000-0001-3609-5024>