

New univalence criteria for an integral operator with Mocanu's and Šerb's lemma

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ABSTRACT.

In this paper we consider a general integral operator for analytic functions in the open unit disk \mathbb{U} and we obtain sufficient conditions for univalence of this integral operator, using Mocanu's and Šerb's Lemma. This integral operator was considered in a recent work Bărbatu, C. and Breaz, D., [The univalence conditions for a general integral operator, Acta Univ. Apulensis Math. Inform., 57 (2019), 133–145]. The results derived in this paper are shown to follow upon specializing the parameters involved in our results. Several corollaries of the main results are also considered.

REFERENCES

- [1] Bărbatu, C. and Breaz, D., *The univalence conditions for a general integral operator*, Acta Univ. Apulensis Math. Inform., 57 (2019), 133–145
- [2] Breaz, D. and Breaz, N., *Two Integral Operators*, Studia Univ. Babes-Bolyai, Math., 47 (2002), No. 3, 13–21
- [3] Breaz, D. and Breaz, N., *Univalence conditions for certain integral operators*, Studia Univ. Babeş-Bolyai Math., 2 (2002), 9–17
- [4] Breaz, D., Breaz, N. and Srivastava H. M., *An extension of the univalent condition for a family of integral operators*, Appl. Math. Lett., 22 (2009), No. 3, 41–44
- [5] Breaz, D., Owa, S. and Breaz, N., *A new integral univalent operator*, Acta Univ. Apulensis Math. Inform., 16 (2008), 11–16
- [6] Frasin, B. A., *Order of convexity and univalence of general integral operator*, J. Franklin Inst., 348 (2011), 1013–1019
- [7] Kim, Y. J. and Merkes, E. P., *On an integral of powers of a spirallike function*, Kyungpook Math. J., 12 (1972), 249–253
- [8] Mayer, O., *The Functions Theory of the One Variable Complex*, Acad. Ed. Bucureşti, 1981, 101–117
- [9] Mocanu, P. T., Bulboaca, T. and Salagean, G. S., *Teoria geometrică a funcțiilor univalente*, Casa Cărții de Știință, Cluj Napoca (1999), 77–81
- [10] Mocanu, P. T. and Šerb I., *A sharp simple criterion for a subclass of starlike functions*, Complex variables, 32 (1997), 161–168
- [11] Oprea, A. and Breaz, D., *Univalence conditions for a general operator*, An. Șt. Univ. Ovidius Constanța, 23 (2015), No. 1, 213–224
- [12] Oversea, H., *Integral operators of Bazilevič type*, Bull. Math. Bucureşti, 37 (1993), 115–125
- [13] Ozaki, S. and Nunokawa, M., *The Schwarzian derivative and univalent functions*, Proceed. American Math. Soc. Math., 33 (1972), 392–394
- [14] Pascu, N. N., *An univalence criterion II*, Itinerant Seminar on Functional Equations, Approximation and Convexity, Cluj Napoca 1985, 153–154
- [15] Pascu, N. N., *An improvement of Becker's univalence criterion*, Proceedings of the Commemorative Session Simion Stoilow, Brașov, Preprint (1987), 43–48

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- [16] Pascu, N. N. and Pescar, V., *On the integral operators Kim-Merkes and Pfaltzgraff*, Mathematica, Univ. Babeş-Bolyai, Cluj-Napoca, **32** (55) (1990), No. 2, 185–192
- [17] Pescar V., *New univalence criteria for some integral operators*. Studia Univ. Babes-Bolyai Math. **59** (2014), No. 2, 185–192.
- [18] Pescar, V. and Breaz, N., *Mocanu and Šerb type univalence criteria for some general integral operators*, Acta Univ. Apulensis Math. Inform., **44** (2015), 1–8
- [19] Pescar, V. and Owa, S., *Univalence of certain integral operators*, Int. J. Math. Math. Sci., **23** (2000), 697–701
- [20] Pfaltzgraff, J. A., *Univalence of the integral $f'(z)^{\lambda}$* , Bul. London Math. Soc., **7** (1975), No. 3, 254–256
- [21] Ularu, N., *Convexity properties for an integral operator*, Acta Univ. Apulensis Math. Inform., **27** (2011), 115–120

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