ON A SUBCLASS OF MEROMORPHIC FUNCTION DEFINED BY NEW DIFFERENTIAL OPERATOR INVOLVING THE MITTAG - LEFFLER FUNCTION
(Subkelas Fungsi Meromorfi Tertakrif oleh Pengoperasi Pembeza Baharu Melibatkan Fungsi Mittag-Leffler)

SARAH AHMED & MASLINA DARUS*

ABSTRACT

In this work, we define a new differential operator with the multiplier transformation containing the Mittag - Leffler function. The multiplier transformation generates a new subclass of meromorphic function. Properties like coefficient estimates, growth and distortion, radii of starlikeness and convexity, and convex linear combination are given. Finally, the extreme points are also discussed.

Keywords: meromorphic function; differential operator; multiplier transformation; Hadamard product; Mittag - Leffler function

ABSTRAK

Dalam kajian ini, pengoperasi pembeza baharu tertakrif oleh jelmaan berganda mengandungi fungsi Mittag-Leffler. Jelmaan berganda ini membina subkelas fungsi meromorfi baharu. Sifat seperti pekali ketaksamaan, pertumbuhan dan erotan, jejari kebakbintangan dan kecembungan, dan kombinasi linear cembung diberi. Akhir sekali, titik ekstrim juga dibincangkan.

Kata kunci: fungsi meromorfi; pengoperasi pembeza; jelmaan berganda; hasil darab Hadamard; fungsi Mittag-Leffler

References

Ameer M.S.A., Juma A.R.S. & Al-Saphory R.A. 2022. Harmonic meromorphic starlike functions of complex order involving Mittag-Leffler operator. *Italian Journal of Pure and Applied Mathematics* **48**: 213–220.

Attiya A.A. 2016. Some applications of Mittag-Leffler function in the unit disk. *Filomat* **30**(7): 2075–2081.

Bansal D. & Prajapat J.K. 2016. Certain geometric properties of the Mittag-Leffler functions. *Complex Variables and Elliptic Equations* **61**(3): 338–350.

Challab K. & Darus M. 2016. On certain classes of meromorphic harmonic concave functions defined by al-Oboudi operator. *Journal of Quality Measurement and Analysis (JQMA)* **12**(1-2): 53–65.

Challab K., Darus M. & Ghanim F. 2017. On a certain subclass of meromorphic functions defined by a new linear differential operator. *J. Math. Fund. Sci* **49**(3): 269–82.

Cho N.E. & Kim T.H. 2003. Multiplier transformations and strongly close-to-convex functions. *Bulletin-Korean Mathenatical Society* **40**(3): 399–410.

Cho N.E., Kwon O.S. & Srivastava H.M. 2004. Inclusion and argument properties for certain subclasses of meromorphic functions associated with a family of multiplier transformations. *Journal of Mathematical Analysis and Applications* **300**(2): 505–520.

Cho N.E. & Srivastava H.M. 2003. Argument estimates of certain analytic functions defined by a class of multiplier transformations. *Mathematical and Computer Modelling* **37**(1-2): 39–49.

El-Ashwah R.M. & Aouf M.K. 2009. Hadamard product of certain meromorphic starlike and convex functions. *Computers & Mathematics with Applications* **57**(7): 1102–1106.

Elhaddad S. & Darus M. 2019. On meromorphic functions defined by a new operator containing the Mittag–Leffler function. *Symmetry* **11**(2): 210.

Elrifai E.A., Darwish H.E. & Ahmed A.R. 2012. On certain subclasses of meromorphic functions associated with certain differential operators. *Applied Mathematics Letters* **25**(6): 952–958.

Gupta I.S. & Debnath L. 2007. Some properties of the Mittag-Leffler functions. *Integral Transforms and Special Functions* **18**(5): 329–336.

Lashin A.Y. 2010. On certain subclasses of meromorphic functions associated with certain integral operators. *Computers & Mathematics with Applications* **59**(1): 524–531.

Liu J.L. & Srivastava H.M. 2004. Subclasses of meromorphically multivalent functions associated with a certain linear operator. *Mathematical and Computer Modelling* **39**(1): 35–44.

Mittag-Leffler G. 1902. Sur la représentation analytique d'une branche uniforme d'une fonction monogène. *Acta Mathematica* **26**(1): 353–391.

Mittag-Leffler G.M. 1903. Sur la nouvelle fonction eα (x). *CR Acad. Sci. Paris* **137**(2): 554–558.

Răducanu D. 2017. On partial sums of normalized Mittag-Leffler functions. *Analele ştiinţifice ale Universităţii" Ovidius" Constanţa. Seria Matematică* **25**(2): 123–133.

Srivastava H.M. & Tomovski Ž. 2009. Fractional calculus with an integral operator containing a generalized Mittag-Leffler function in the kernel. *Applied Mathematics and Computation* **211**(1): 198–210.

Wiman A. 1905. Über den fundamentalsatz in der teorie der funktionen E a (x). *Acta Mathematica.* **29**(1): 191–201.

Department of Mathematics,
College of Education for Pure Science,
University of Kerbala,
IRAQ
E-mail: sara.ahmed@uokerbala.edu.iq.

Department of Mathematical Sciences,
Faculty of Science and Technology,
Universiti Kebangsaan Malaysia,
43600 UKM Bangi,
Selangor,MALAYSIA
E-mail: P102354@siswa.ukm.edu.my, maslina@ukm.edu.my*

---

*Corresponding author