UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

EXTREMAL PROPERTIES OF CERTAIN CLASS OF CLOSE-TO-CONVEX FUNCTIONS

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P02M23

Report submitted in partial fulfilment of the requirement for the degree of
Bachelor of Science (Hons.) Mathematics
College of Computing, Informatics and Mathematics

AUGUST 2023

ACKNOWLEDGEMENTS

Thanks to Allah, So Kind and Caring.

First and foremost, we want to say a huge thanks to Allah S.W.T. for blessing us with the power and tenacity to take on and complete this project successfully. We initially extend our profound gratitude to Allah S.W.T., who graciously endowed us with the strength to successfully undertake this project. We further wish to relay our immense appreciation to our supervisor, Abdullah Bin Yahya. His guidance, recommendations, collaborative spirit, and invaluable insights played a significant role in facilitating the successful completion of this study. In fact, we have learned many new things from our supervisor Abdullah Bin Yahya. Also, we thank our friends for their comments, cooperation and support during our study.

We want to express our appreciation for their support and express our hope that they will continue to offer their support in the future.

Lastly, we are grateful to our parents and family for their blessings and prayers and for providing support.

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ABSTRACT

This study is concerned with the theory of geometric functions represents a subdivision within the broad field of complex analysis. Every class of functions has extremal properties which are coefficient bound and growth theorem. This is a study of classical mathematics which involves many definitions and theorems that must be proved. In addition, it is also hard to introduce a unique class of univalent functions because some of class the function may not univalent. In this study, identifying the extremal properties presents challenges as suitable calculation methods are scarce and can prove to be intricate. The new generalized class of functions that are close-to-convex function $M(\lambda,\delta,t)$ and $f(0)=f'(0)-1=0$, that satisfies $\mathrm{Re}\left\{\frac{e^{i\lambda}zf'(z)}{g(z)}\right\}>\delta$ where $|\lambda|<\frac{\pi}{2},\cos\lambda>\delta,0\le\delta<1,g(z)=\frac{z}{1-(1-t)z}$ and $-1\le t\le 1.$ The objectives for this study are as to determine a new class of close – to – convex function and to find extremal properties of this class of function by using Herglotz and representation theorem. The new result of the coefficient bound that obtain is

$$|a_n|\le\frac{2}{n}\left[\frac{1}{2}+(1-t)(n-1)B_{\lambda\delta}\right].$$

When $M(\lambda,\delta,-1)$, then found that

$$\begin{aligned}|a_n|&\le\frac{2}{n}\left[\frac{1}{2}+(1-(-1))(n-1)B_{\lambda\delta}\right]\\&\le\frac{2}{n}\left[\frac{1}{2}+2(n-1)B_{\lambda\delta}\right],\end{aligned}$$

Therefore, the result will become the new result of coefficient bound. Based on the result, this might help other researchers to find other new extremal properties of this class of function as their references.