UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

HANKEL DETERMINANTS FOR CERTAIN CLASS OF ANALYTIC FUNCTIONS SUBORDINATE WITH EXPONENTIAL FUNCTIONS

P19M19

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Report submitted in partial fulfilment of the requirement
for the degree of
Bachelor of Science (Hons.) Mathematics
Faculty of Computer and Mathematical Sciences

JULY 2019

ACKNOWLEDGEMENT

IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

Most importantly, we would like to express our sincere gratitude to our supervisor, Pn. Norlyda Mohamed for her invaluable guidance and continuous support in making this project possible. We appreciated her guidance from the beginning till the end of this project. Without her advices and assistance, it would be hard to complete this project correctly. We are also thankful for the time spent proofreading and correcting out our mistakes.

We would also like to thank our classmates and friends for their helps and comments when we were in a tough spot. Not to forget, our parents for being supportive and understanding throughout the completion of this project.

Last but not least, thank you to each of our members for constantly give cooperation and not giving up despite having to go through many challenges in completing this project.

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ABSTRACT

In geometric functions theory, there are many subclasses that had been identified and introduced by researchers. It is normal for researchers to introduce new subclass of functions and find the related properties of that class of functions. We found out that there are not many existing projects that study on Hankel determinant for certain class of analytic functions subordinate with exponential functions. In this project, we aim to investigate the Hankel determinants which are Fekete-Szegö functional, second Hankel determinant and third Hankel determinant for the class of functions subordinate with exponential functions. So, we introduced the new subclass of analytic functions subordinate to exponential functions, K_{α}^{*} which satisfy

$$\frac{zf'(z)}{f(z)} + \alpha \frac{z^2 f''(z)}{f(z)} \prec e^{w(z)}$$

where $0 \leq \alpha \leq 1$ and $z \in \mathbb{H}$. A few methods are used to get the results for the Hankel determinants such as comparison of coefficient, triangle inequalities, application of lemmas and maximization of functions. In conclusion, we had found the Hankel determinants which are Fekete-Szegö functional, second Hankel determinant and third Hankel determinant of our new subclass of function subordinate with exponential function in this project. The findings of this study will give contribution to geometric function theory where the new class of analytic functions is defined. The result obtained from this research will be applicable to the new researcher to develop new class of functions and identified the bounds on Hankel determinants. So, we hope that other researchers in the future research can introduce some new defined subclasses of analytic functions subordinate to exponential functions and its properties.