UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

UPPER BOUND OF FEKETE-SZEGÖ DETERMINANT FOR α-CLOSE-TO-CONVEX FUNCTIONS

P02S18

SARAH BINTI ROSLAN
(2016728305)
NIK HASHIMAH BINTI RASHIDEE
(2016577381)
NUR NADIRA ASHYIKIN BINTI MUHAMMAD FUAD TIEW
(2016328775)

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

DECEMBER 2018

ACKNOWLEDGEMENT

Alhamdulillah, all praise to Allah SWT, the Almighty and the Most Merciful, for the blessings He has lavished upon us throughout the time of making this research a triumph. We would like to take this opportunity to express our sincerest gratitude and deepest regards to those who provided us the possibility to complete this report.

First and foremost, a heartfelt appreciation to our supervisor, En. Abdullah Yahya for his exemplary beacon, monitoring and constant encouragement which have enormously helped us all the times amidst the endeavour of completing this research. His immense knowledge and profound experience in Geometric Function Theory has enabled us to finish this research successfully.

Not to forget, many thanks to the lecturers of Universiti Teknologi MARA for their help and cooperation where they have providing us valuable information, suggestions and guidance in the compilation and preparation of this research.

Last but not least, deepest thanks to our parents, families and friends for their cheering and full support upon the completion of this research; from the beginning until the end. Also, thanks to everyone that has been supporting and helping us in the progress of actualising the result of the research.

The blessings, helps and guidance bestowed by everyone from time to time shall carry us a long way in this journey of life on which we are about to embark.

TABLE OF CONTENTS

LIST OF FIGURES

ABSTRACT

Every class of functions have their own unique properties, however each class can only be computed by using certain methods hence it has become cumbersome in determining which method is the best suited for which class of functions. The study is conducted to discover new subclass of analytic functions, and find the Fekete-Szegö determinant for the new subclass of analytic functions.

A class of α-close-to convex functions, $\mathcal{Q}(\alpha,\delta,t)$ defined in the unit disk, $\mathfrak{U}=\{z\in\mathbb{C}:|z|=1\}$ which satisfied the condition $\mathrm{Re}\left\{e^{i\alpha}\frac{zf'(z)}{g(z)}\right\}>\delta$, for $z\in\mathfrak{U}$, $|\alpha|\le\pi$, $\cos\alpha>\delta$ and $g(z)=\frac{1}{(1-tz)(1-z)}$ where $-1\le t\le 1$ was investigated.

The technique of comparing two coefficients, c_2 and c_3 from Kaharudin, Akbarally and Mohamad (2010), the application of lemma by Pommerenke (1975), and the triangle inequality, were been utilised with the purpose of acquiring the main results.

The findings had also contributed new results under Fekete-Szegö determinants which could be simplified into Srivastava, Mishra and Das (1999) and Kaharudin et al. (2010). Meanwhile, the class $g(z)$ was similar to the class found by Koebe (1907) and Yahya, Soh and Mohamad (2013) which is also a part of Sakaguchi function (Sakaguchi, 1959), hence the inequalities obtained were also the Fekete-Szegö determinants for Koebe function and Sakaguchi functions respectively. Correspondingly the results obtained would act as a guidance and reference to the others mathematicians and subsequently would strengthen previous studies' result. It is suggested that to always opt for the simplest form of equations specifically for fractions. This is because there are a lot of theorems that need to be proved and one requires a lot of steps, so using the simplest form of fractions really turns out to be useful.