SOLVING NONLINEAR EQUATION USING BISECTION METHOD AND ITS VARIANTS BASED ON MATLAB GUI

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Thesis submitted in fulfilment of the requirement for
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August 2023

ABSTRACT

Most problems in engineering and science field can be in the form of root findings. In addition, the solution of finding root of function can be solved either in analytical methods or numerical methods. However, these analytical methods are quite complicated and difficult. Researcher tends to use numerical method in the form of bracketing method which is quite simple and easy compared to the analytical method. Bisection was stated as the simplest among all bracketing method. In this research, five different variants of Bisection which are Bisection, Modified Bisection Algorithm, Trisection, Regula Falsi and fzero were used to approximate the root of 15 different functions. This research has performed bibliometric analysis to review the variants of Bisection Method. Based on previous research, each variant of Bisection have advantages and disadvantages which some only could not solve certain problems so other variant method had been proposed to overcome the problem. All of the method were included in MATLAB GUI to ease the process because all user needed was to key in the input ask and choose which method to get the root. The result was based on number of iterations, computational time and error analysis. Based on the result obtained, it can be concluded that fzero is the best method for number of iterations while Modified Bisection Algorithm and Regula Falsi was the best method if compared based on computational time.

ACKNOWLEDGEMENT

Firstly, I would like to express my heartfelt gratitude to Allah, the Most Merciful and the Most Gracious, for granting me the strength, guidance and blessings throughout the completion of this research.

I am deeply indebted to my supervisor, Dr. Nur Idalisa binti Norddin, for her exceptional guidance, unwavering support, and invaluable insights. Her expertise, constructive feedback and mentorship have been instrumental in shaping the direction and quality of this work. I am truly grateful for her constant encouragement and belief in my abilities.

I would also like to extend my deepest appreciation to my parents for their unconditional love, encouragement and sacrifices. Their unwavering support and belief in my potential have been a constant source of inspiration. I am forever grateful for their guidance and the values they instilled in me.

Lastly, I extend my gratitude to all the participants who generously shared their time, knowledge and experiences contributing to the richness of this study. Their willingness to engage in meaningful discussions and provide valuable insights has been immensely appreciated.

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