

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**THE STUDY OF GROWTH RATE OF MANGROVE
BY
COMPARING BETWEEN BLACKMAN'S
EQUATION AND
THE REAL GDP UNADJUSTED YEAR-ON-YEAR
QUARTERLY GROWTH FORMULA**

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

JULY 2016

ACKNOWLEDGEMENTS

Alhamdulillah, first and foremost, this thankful goes to ALLAH the Almighty for His bless and tenderness. We have finally completed final year project report. A special gratitude goes to my supervisor Madam Aimi, for her advise, guidance, support and also on time she has spent for us order to complete our project. Special thanks to our parents for their big hands in supporting us, advise and prays and 'Doa' for us through days and nights. For our siblings, a bucket of thank you(s) for their encouragements and support. Last but not least, we would like to thank also gratitude to all friends and for the rest people who I do not state here, whom have contributed to this study either directly or indirectly. Thanks for such brilliance ideas and precious time spent.

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ABSTRACT

Mangroves are fundamental to sustain coastal environments hale and hearty, to offer nutrients for a number of food chains, and to contribute priceless goods and services that maintain and expand human livelihoods. Mangroves act as natural barriers for unwanted events caused by the seas. Sea-level reconstruction offers protection from waves, tidal bores, tsunamis and shoreline erosion as to provide stability for environmental constancy. Mitigation of effects by climate change, provision nutrients for marine life, prevention soil erosion, these occurrences can be done by plantation of mangroves. Blackman's equation is one of the sources in calculating growth rate of any plants and was published by R.B. Blackman in 1943. Inputs needed in generating this equation are various, for example weight of plants, surface area of leaves, density of plants and mass of leaves. Regardless formulas used in getting growth rate of plants either exponential growth equation or growth rate formula, still Blackman's gives same outputs. This means Blackman's can be exposed to students as another way to solve questions related to find growth rate of plants. However, re-planting of mangroves may help to reduce huge impacts of any unexpected phenomenal mother-nature's events nearby seas.

1 INTRODUCTION

1.1 Contextual

One of the earth's ecosystem characteristics is that evolution, which means reaction by organism and fitting to spatial and temporal forms in climate and other physical attributes. Such as tectonic events, atmospheric and oceanic circulation and land from setting. For examples, biological and ecological vagaries are frequently the effect of individual, population and community features such as tolerance to physicochemical factors, the skill to compete for preventive resources and useful processes. All of these variations happen within of natural disturbance to the ecological equilibrium or "steady state". All ecosystems are issues to a change of disturbance that differ in their period, size, frequency and intensity and play a critical role in facilitating modification. There are such conditions like high salinity, strong winds, high temperatures and muddy, anaerobic soils and extreme tides are existed in tropical and sub-tropical latitudes and mangroves are woody plants that grow at the interface between land and sea in these latitudes (Bingham and Kathiresan 2001). A study conducted by Bingham and Kathiresan (2001) stated that there may be no other group of plants with such highly developed morphological and physiological adaptations to extreme conditions by any means home to varieties of Epibenthic, Infaunal, and Meiofaunal Invertebrates. Mangrove forest ecosystems fulfill a number of important functions and provide a wide range of services at the local and national levels especially for fishermen, farmers and other rural populations depend on them as a source of wood and non-wood forest products (Food and Agriculture Organization of the United Nations, 2007). The Food and Agriculture Organization of The United Nations (2007) stated that mangroves support the conservation of biological diversity by providing habitats, spawning grounds, nurseries and nutrients for a number of animals including several endangered species and range from reptiles. Because of their environment, mangroves are necessarily tolerant of high salt levels and have mechanisms to take up water despite strong osmotic potentials (Bingham and Kathiresan 2001)