

UNIVERSITI TEKNOLOGI MARA

**MODIFICATION OF THREE TERM
CONJUGATE GRADIENT METHOD
FOR SOLVING UNCONSTRAINED
OPTIMIZATION**

**NURUL HAFAWATI FADHILAH BINTI
HUSSIAN**

Thesis submitted in fulfillment
of the requirements for the degree of
Master Of Science (Mathematics)

Faculty of Computer and Mathematical Sciences

August 2019

ABSTRACT

Conjugate Gradient (CG) methods have an important role in solving large scale unconstrained optimization. These methods are recognized due to its low memory requirement and convergence speed. However, some CG methods still possess high number of iteration and CPU time when apply in the real life problems. Hence, the researchers come out with many alternatives in order to improve the efficiency of the CG methods. Recently, Three Term CG method has become a research trend of CG method. The problem arise when the existing Three Term CG methods could only be used with inexact line search. When exact line search is applied, the formula of Three Term will be reduced to the standard CG method. Therefore, there is a need to come out with a new Three Term method that could be used with exact line search. In this research, a new three term method has been proposed. This new proposed method satisfies both sufficient descent condition and global coverage properties under exact line search. Numerical results show that this proposed method outperforms the well-known classical CG and some hybrid methods. Performance profile of numerical computation in term of number of iteration and CPU time on the different initial point and some optimization problems had shown the robustness and efficiency of this new three term coefficient. An application in the regression analysis is also included to prove the applicability of new proposed method in the real life problem.

ACKNOWLEDGEMENT

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

Firstly, I am grateful to Allah S.W.T for giving me the strength and opportunity to embark on my Master and for completing this challenging journey successfully.

I would like to express my deep gratitude and thankful to my supervisor, Dr Mohd Rivaie Mohd Ali and my co-supervisor Dr Fuziyah Ishak who expertly guided me and give valuable advices and support through my research. I will always remember your constant guidance and encouragement and this will be last forever. Thank you very much for always being there when I needed and teach me a lot of new knowledge and new experiences.

Special thanks to my very dear father, Hussian Abdullah and my lovely mother, [REDACTED] Thank you to both of you for giving me a chance to continue my study and thank you for always supporting me. A lot of thanks to my only sister, Hidayah Fathihah and Hamzah Faiz which always have time for hearing my burdensome and support me in many kinds of ways. Thank to my other younger siblings that give me joy when I am in stress mode in my research.

My appreciation goes to Puan Badariah and Puan Suzetty, Postgraduate Academic Affairs who are very helpful persons during the master time. My thankfulness also to Puan Tini, Puan Siti and college staffs who provided the facilities to stay in College Kerawang, Kuala Terengganu.

Finally, I am extending my thank to my education partner, Nuridalisa and my senior, Atikah Ramli and Imza Fakhri for helping me by exchanging the ideas, valuable comments and suggestions within the research. I also would like to thank to NurAqila, Norshahera, Auni Fathihah, Afiqah Najihah, Siti Rohana and Atikah Aziz and others that always give me courage and cherish me during my research time.

Their willingness to motivate contributes tremendously to my research. I am glad for having all of you in my life. Thank you for made my studies more enjoyable.

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