

**NUMERICAL PERFORMANCE OF  
THREE CONJUGATE GRADIENT METHODS  
USING EXACT LINE SEARCH**

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## DECLARATION BY CANDIDATE

I certify that this report and the project to which it refers is the product of my own work and that any idea or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.



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## ABSTRACT

Conjugate Gradient (CG) methods have been practically used for solving unconstrained optimization problem. It is the most well known iterative techniques. CG methods deals with a test functions that come from a library CUTE test functions. Different test functions will lead to different shape. This project focuses on the three CG methods which are PRP, RMIL2012 and DY with a two test functions which are Three Hump Camel Function and Dixon and Price Function. The test functions use are based on the valley shape. Many researcher only deal with initial point suggested interval of initial points, global solutions and different obstacles. Therefore, this study is conducted in order to know the sensitivity on the starting point and based on the result, it shown that an unstable condition has been detected when the decimal point is applied as an initial point. The performance profile that introduced by Dolan and Moré is used in order to analyze an efficiency of the method used. Based on the result, it shown that the focusing methods which are PRP and RMIL2012 is the best method for solving the problem. Finally, the trajectory plot for all of the methods and test functions have been done in order to know the movement from the initial point to the solution point. Based on the result, it shown that the zig zag pattern for the two test functions is less obviously can be seen since the number of iterations is small.

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