ME7223: ASSIGNMENT 4

SAARTHAK SANDIP MARATHE | ME17B162

Summarization of all the methods being used:

Objective: Find the point of minima for f(x) = x^2+2x

Method	No. of experiments	Interval	Interval Length	Optimal Point	f(Optimal Point)
Accelerated Search	5	NA	NA	-0.8	-0.96
Exhaustive Search	19	[-1.2500, -0.5500]	1.8	-0.9	-0.99
Dichotomous Search	8	[-1.2503, -0.8118]	2.0621	-1.031	-0.99904
Interval Halving	9	[-1.2500, -0.8125]	2.0625	-1.0312	-0.99903
Fibonacci	6	[-1.3846, -0.8462]	2.2308	-1.1154	-0.98668
Golden Section	6	[-1.3476, -0.7164]	2.064	-1.032	-0.99898

Inference:

<u>Closeness to solution:</u>
The exact value of optimal solution is **-1**. From the table we can see that, Exhaustive Search, Dichotomous Search, Interval Halving, Golden Section are the closest solutions to the exact value. Fibonacci method following closely the above mentioned with very less (order $x10^{-2}$) value.

<u>Interval Length:</u>
The most bound interval is Exhaustive Search. While Dichotomous Search, Interval Halving, Golden Section closely following it. After this, Fibonacci method follows.

<u>No of experiments required:</u>
Exhaustive Search is the costliest of all the methods being used (much higher than the others being used). Few other methods which give very close answers but require much lesser number of experiments are Interval Halving, Dichotomous Search, Fibonacci, Golden Section. Accelerated Search takes the least no of experiments but the deviation from the exact optimal point is the highest.

Conclusion:

Through the analysis of accuracy, space complexity and boundness of the solution for the given function: Golden Search is the most apt contender followed by Dichotomous Solution. After which comes Fibonacci, Interval Halving method. Exhaustive Search has high space complexity even if the accuracy high. Accelerated Search being the least accurate one and least favourable of all.