

EE457 HW3 REPORT

In this homework, I implemented and evaluated the performances of several iterative algorithms for the Rosenbrock function.

In P1 the results were as expected. For alpha fixed to $1e-3$, the algorithm diverges since the step size is big and it overshoots the minimum. When alpha fixed to a lower value it converges to 1 which is very close to the minimum.

In P2, the steepest descent algorithm was implemented by finding the minimum alpha in each interval. This is computationally expensive as the minimum alpha is found by applying secant method. I failed to implement the algorithm.

In P3, since applying secant method was expensive, fixing the alpha by meeting the condition of Armijo was the optimal solution. This is less accurate than the secant but surely faster.

In P4, Armijo-Goldstein conditions were more restrictive than the previous condition since it bounds alpha by two sides. Thus, this meant a better alpha and faster convergence.

In P5, the Newton's Method was applied by calculating the Hessian. The inverse of Hessian might not be always available and it is expensive.

In P6, the algorithm uses the secant method and better alpha values was obtained. Thus, this meant a convergence in lower iterations and faster convergence.

In P7, Armijo conditions was used for the line search and it speeded up the convergence.

In P8, two bounds were used by Armijo-Goldstein for the alpha value and we had faster convergence.