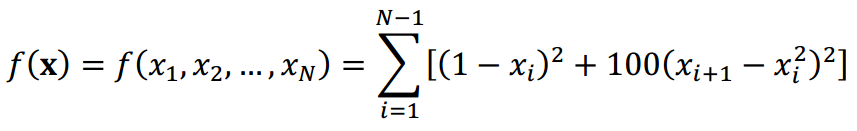
**Question 8:**

1. **Derive the analytical expressions of gradient and Hessian of Rosenbrock function.**

Rosenbrock function:



i.e:

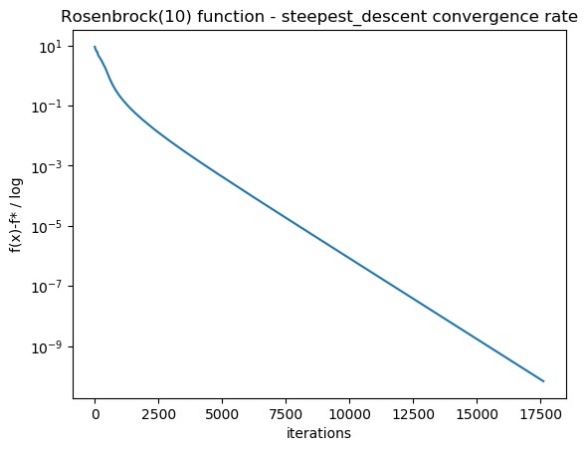
Denote the sum:

Rosenbrock function gradient:

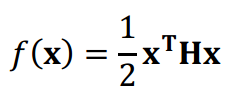
Rosenborck Hessian:

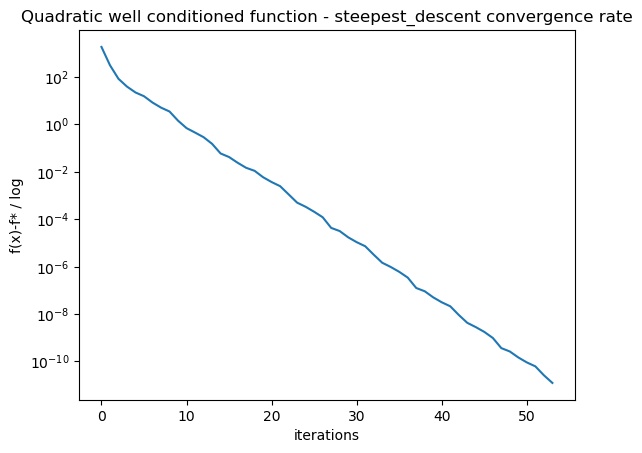
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | 0 | 0 | … | 0 |
|  |  |  | 0 | … | 0 |
| 0 |  |  |  | … | 0 |
| 0 | 0 |  |  | … | 0 |
| 0 | 0 | 0 | … |  |  |
| 0 | 0 | 0 | … |  |  |

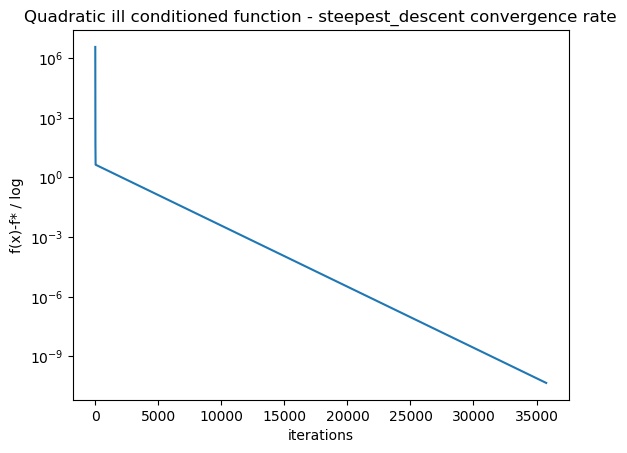
1. **Use the gradient descend method to find the optimal point of the Rosenbrock function:**

****

1. **Use the gradient descend method to optimize the following quadratic function:**



****

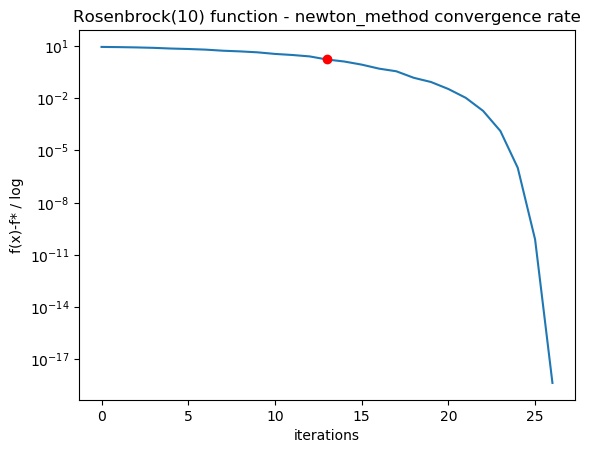
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**Question 9:**

1. **Repeat the previous task but now use the Newton method:**

On the plots, mark the point where the convergence rate changes from linear to quadratic. Do all the graphs have this transition?

**Answer:** No, because Quadratic function converges to optimal point in single step.

****

