Methodology

This section describes the implementation methodology and experimental setup used in the optimization project.

Algorithm Implementation

Gradient Descent Algorithm

The core algorithm implements the following iterative procedure:
Input: Initial point x_0, step size α, tolerance ϵ, maximum iterations N
Output: Approximate solution x^*

```
k = 0
while k < N:
     f = compute_gradient(x_k)
    if || f|| <  :
        return x_k  # Converged
    x_{k+1} = x_k -   f
    k = k + 1
return x_k  # Maximum iterations reached
```