Observations:

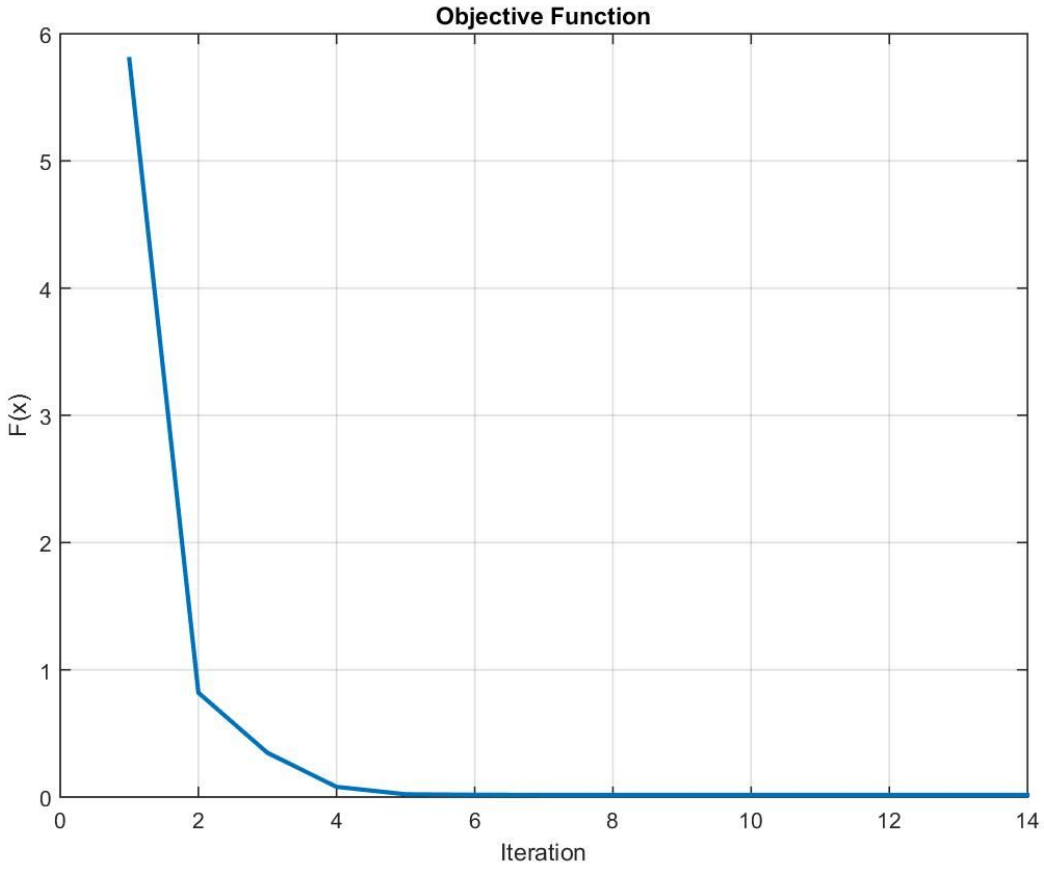
- Gradient descent
    - heavily dependent on the starting point and alphamax (step length). In case of gradient descent, the point [-1.2,1] got stuck on the error value of 4.
    - One of the improvements that were observed was after the use of normalization of the gradient in case of gradient descent. The errors were encountered much less frequently.
- Newton's method
    - Does automatic scaling, and is resistant to errors.
    - Highly computationally expensive
    - Zoom function gets caught in infinite loop:
        - If alpha_low and alpha_high gets close enough,zoom breaks the loop (Heuristic applied)

Code:

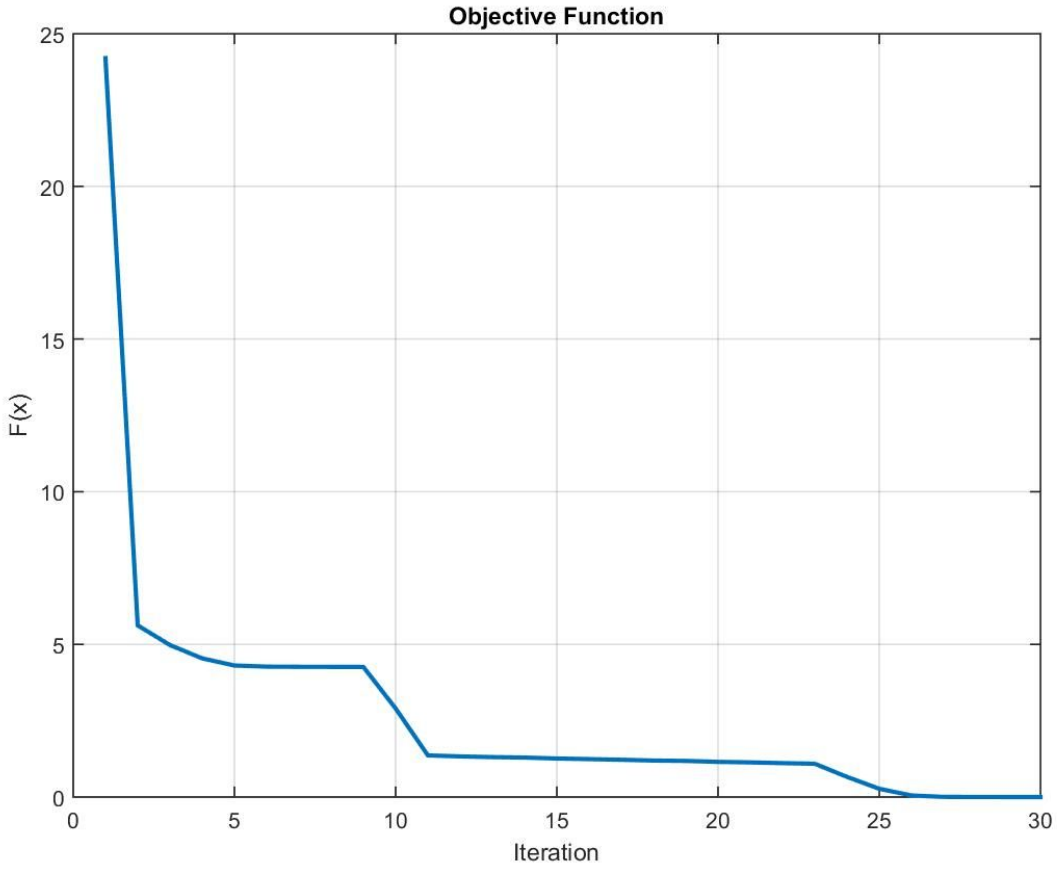
- **main.m**: Starting point of the execution: calls the method functions in the order
- **rosenbrock.m**: Returns symbolic rosenbrock method which is evaluated at runtime
- **getphi.m:** Subroutine used in zoom function
- **gradientdescent.m**: Includes implementation of gradient descent using backtracking
- **gradientdescent_wolfe.m**: Includes implementation of gradient descent with wolfe conditions
- **newtons_method.m**: Includes implementation of newtons method using backtracking
- **newtons_method_wolfe.m**: Includes implementation of newtons method with wolfe conditions
- **evaluate_f.m:** Evaluates symbolic function at runtime

PLOTS:

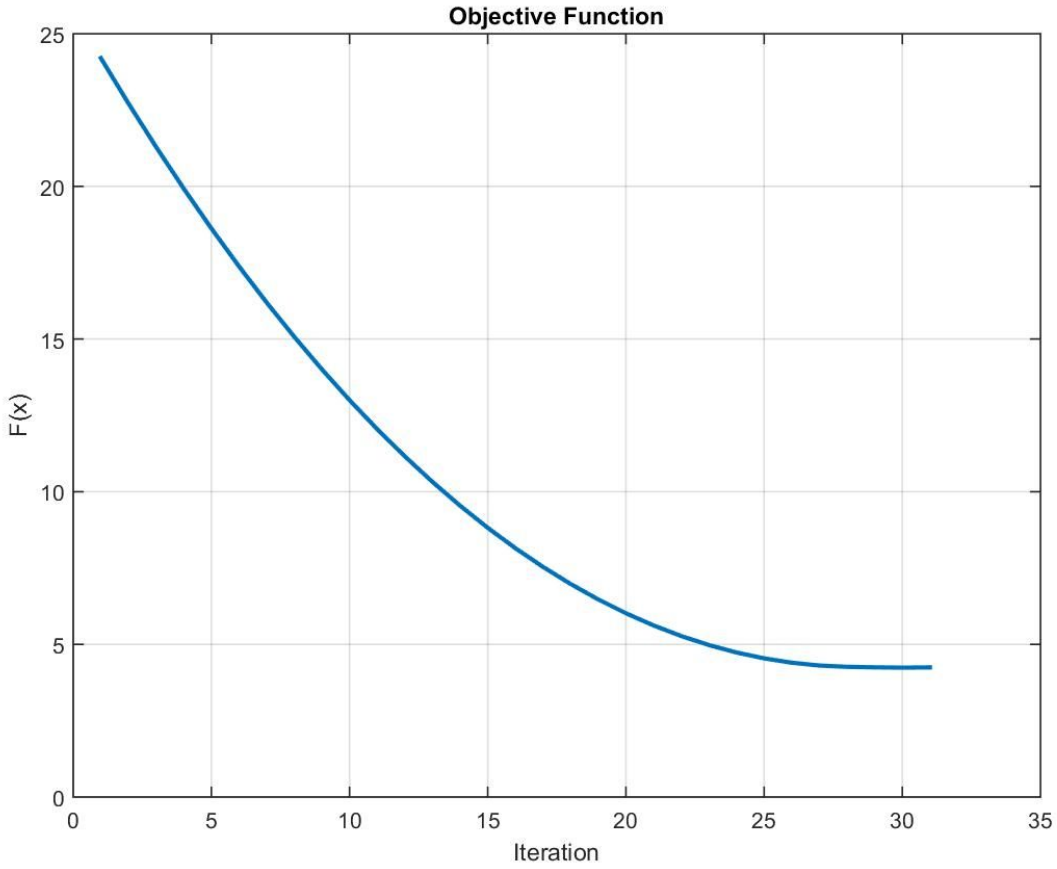
The plot of gradient descent with backtracking on rosenbrock function with [-1.2,1] as the starting point:



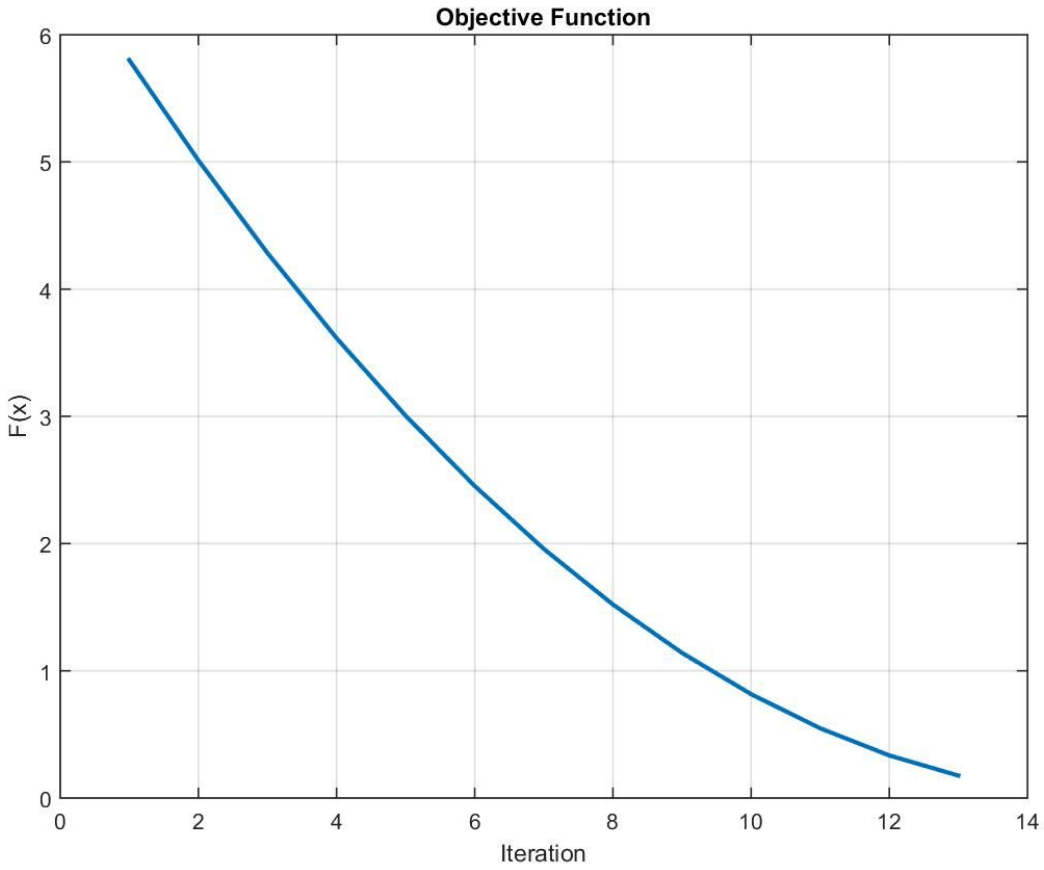
The plot of gradient descent with backtracking on rosenbrock function with [1.2,1.2] as the starting point:



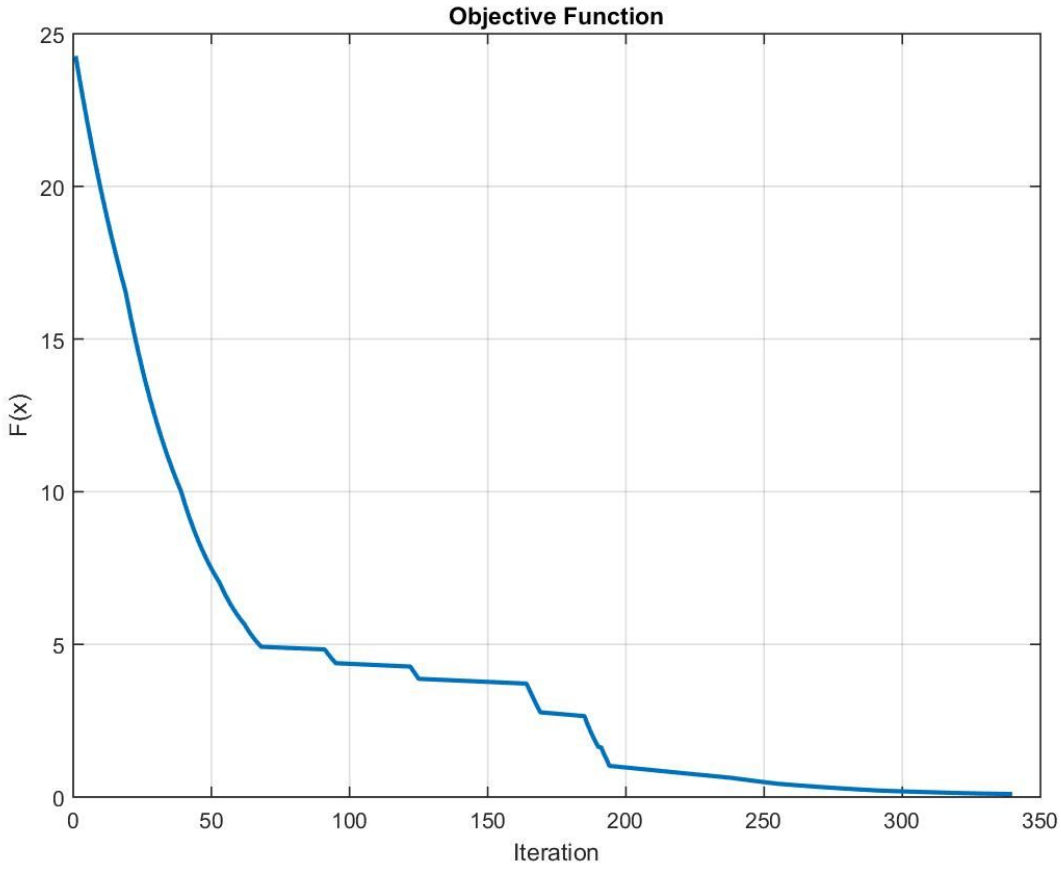
The plot of gradient descent with wolfe conditions on rosenbrock function with [-1.2,1] as the starting point:



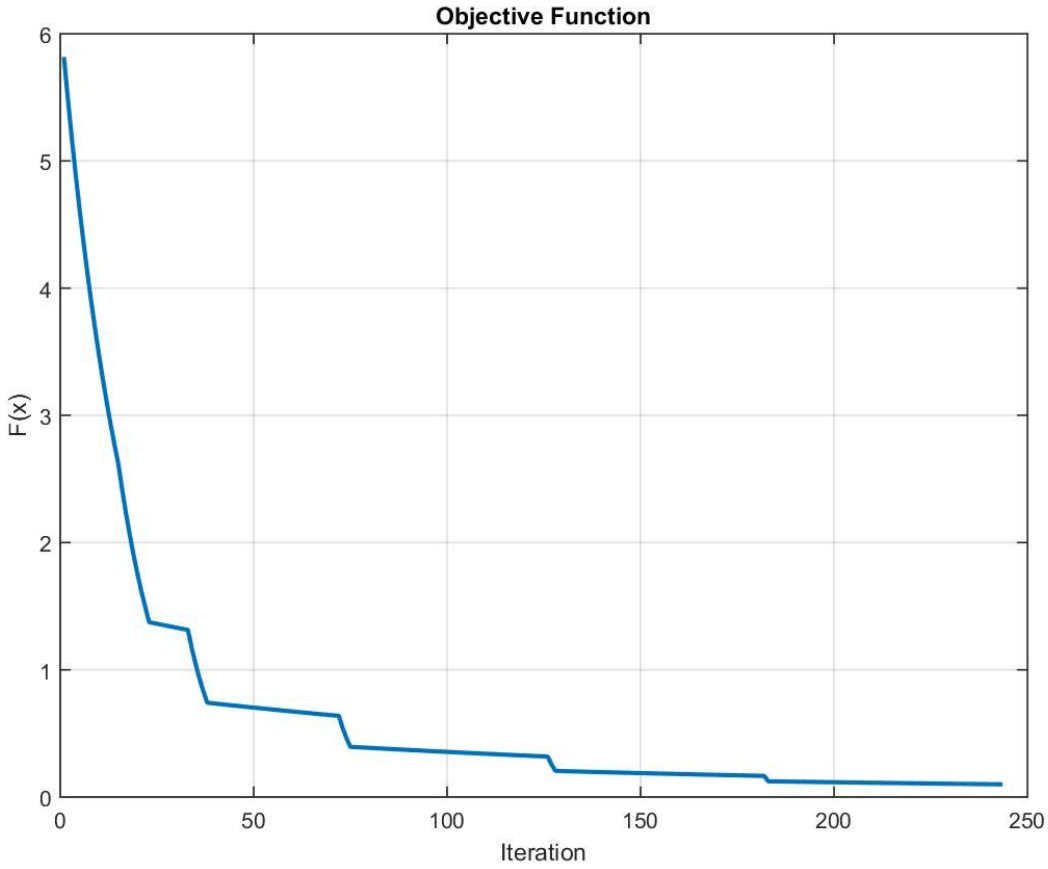
The plot of gradient descent with wolfe conditions on rosenbrock function with [1.2,1.2] as the starting point:



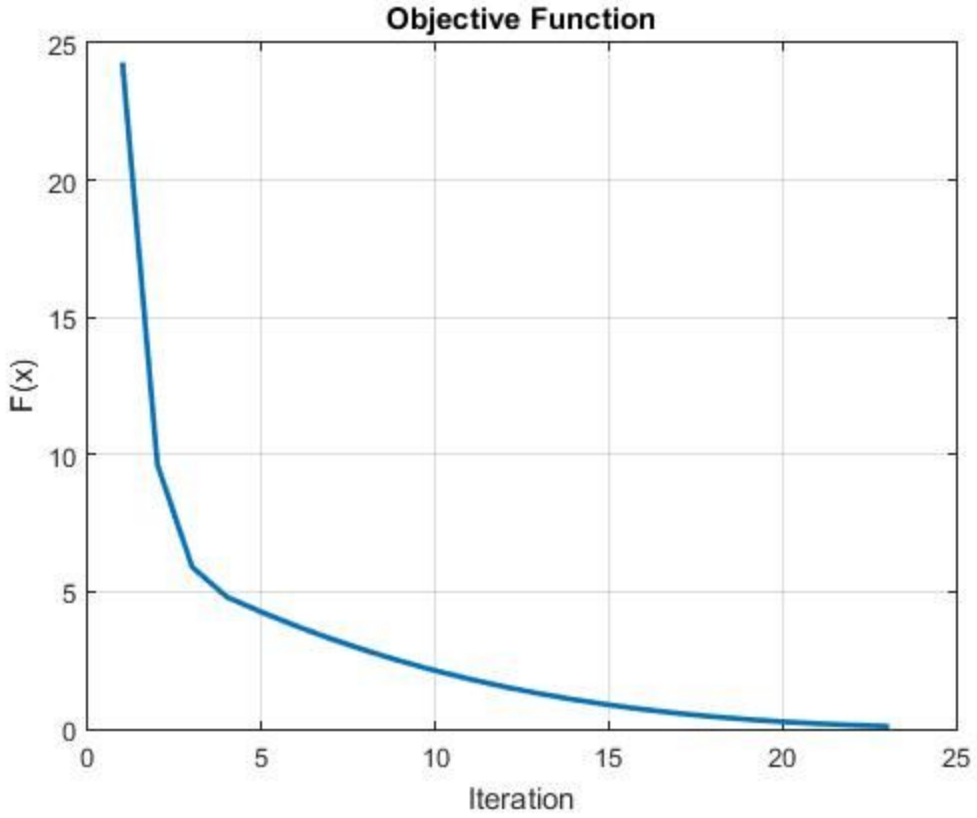
The plot of newton method with backtracking on rosenbrock function with [-1.2,1] as the starting point:



The plot of newton methond with backtracking on rosenbrock function with [1.2,1.2] as the starting point:



The plot of newtons method with wolfe on rosenbrock function with [-1.2,1] as the starting point:



The plot of newton method with wolfe on rosenbrock function with [1.2,1.2] as the starting point: