

Function Evaluated on:

- (problem 4.3, page 98, text) Homework function
- Quadratic function
- Rosenbrock

Discussion:

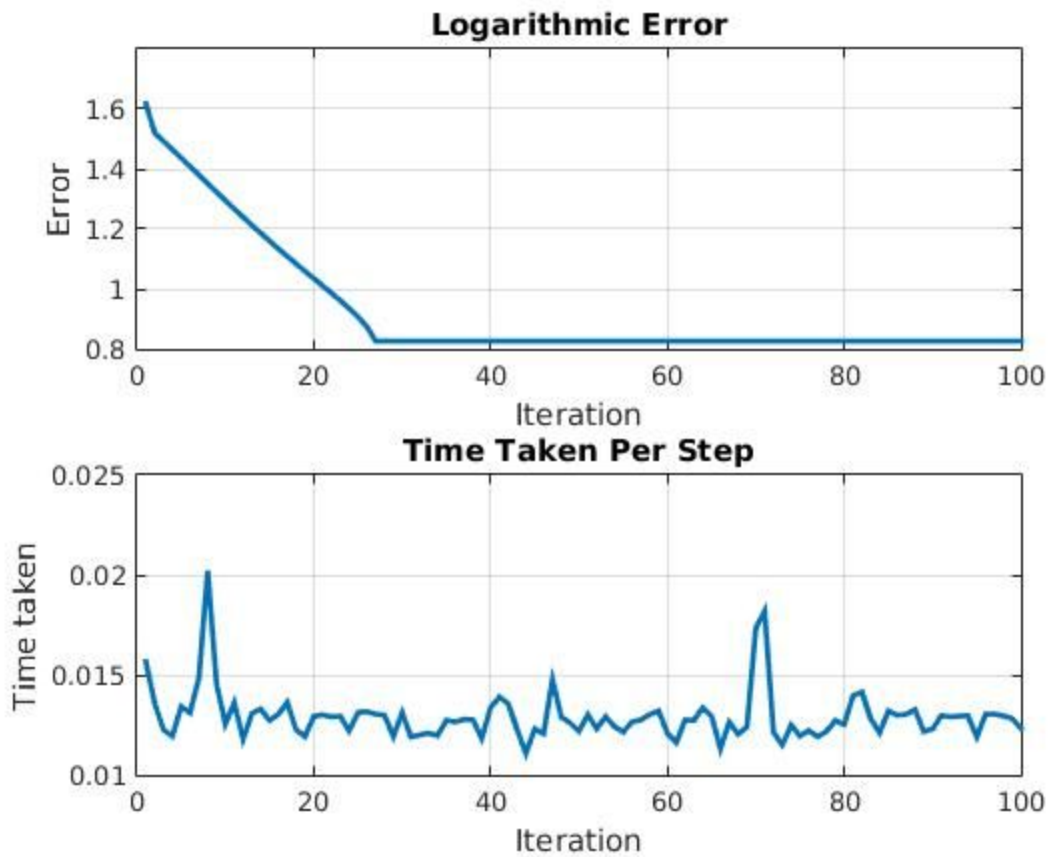
- Homework function (12-dimensional input): Works good at certain locations, at other locations, the trust-region tends to zero. Selected the locations after randomization and applying line search methods to the points.
- Evaluated on Quadratic function of 4 dimensions, all the trust-region method works consistently good.
- Evaluated on Rosenbrock function, all the trust-region method works consistently good.

Analysis:

- On average run, Dogleg method worked best, but was the most CPU intensive.
- Iterative method was the fastest with respect to CPU time.

Code:

- findtau.m --- contains code for equation solver used in dogleg method
- gradientdescent.m --gradient descent code
- newtons_method_subspace.m --Code for subspace minimization
- newtons_method_dogleg.m --Code for dogleg method
- newtons_method_iterative.m -- Code for iterative newton trust-region subspace method
- quadratic_func.m --contains quadratic 4 dimension function
- rosenbrock.m --contains rosenbrock function
- hw3func.m --contains main function utilized for homework given on problem 4.3, page 98
- logs.txt-- Contains logs for one of the runned instances
- jpg images -- plots for methods



Trust-region newton method (Iterative method):

Starting point:

$x = [0.9800; 0.8121; 0.3678; 0.8734; 0.8551; 0.9032; 0.3760; 0.2975; 0.0772; -0.1378; 0.8106; 0.5418]$

$F(x)=5.3810$

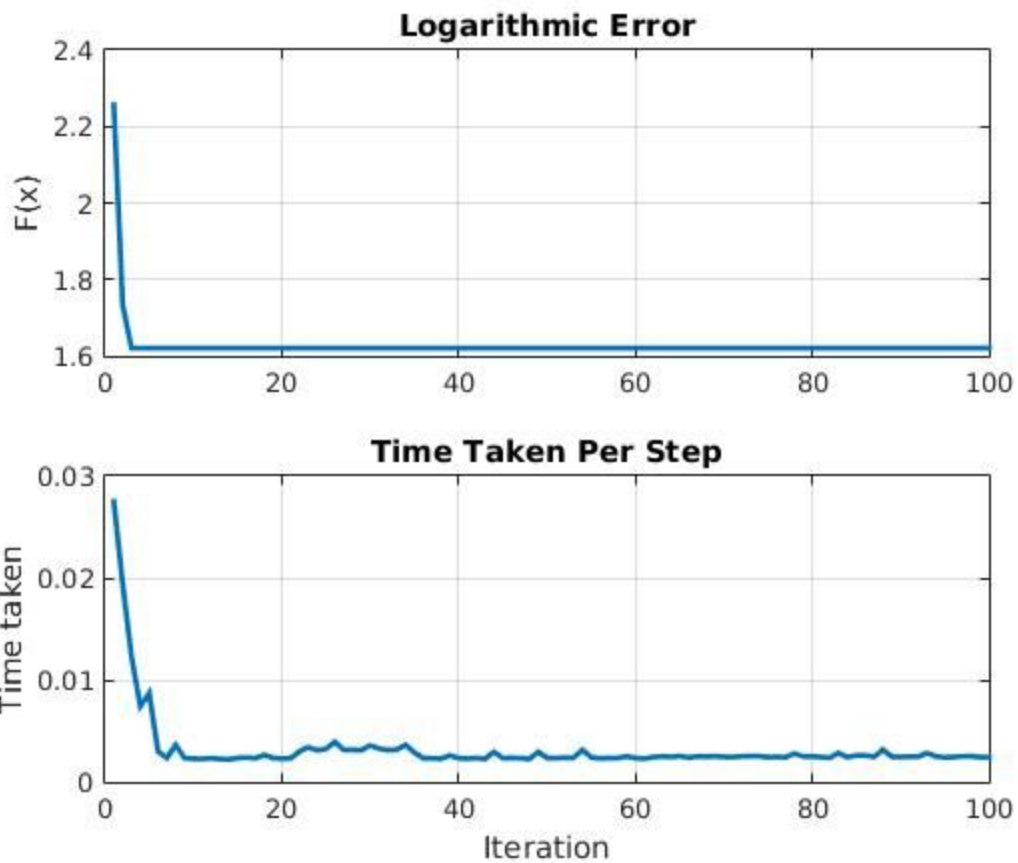
Converging value:

$x=[0.920907; 0.840571; 0.583611; 0.610446; 0.919539; 0.863446; 0.390558; 0.235541; 0.0333034; 0.0820268; 0.757127; 0.565765]$

$F(x)=2.2845$

Iterations: 100

Time taken : 1.568268 seconds.



Trust-region newton method (Subspace minimization):

Starting point:

$x = [0.7967; 0.0322; 0.0121; 0.5089; 0.6617; 0.9302; 0.1893; 0.9486; 0.0772; 0.3338; 0.5090; 0.1753]$

$F(x) = 19.4516$

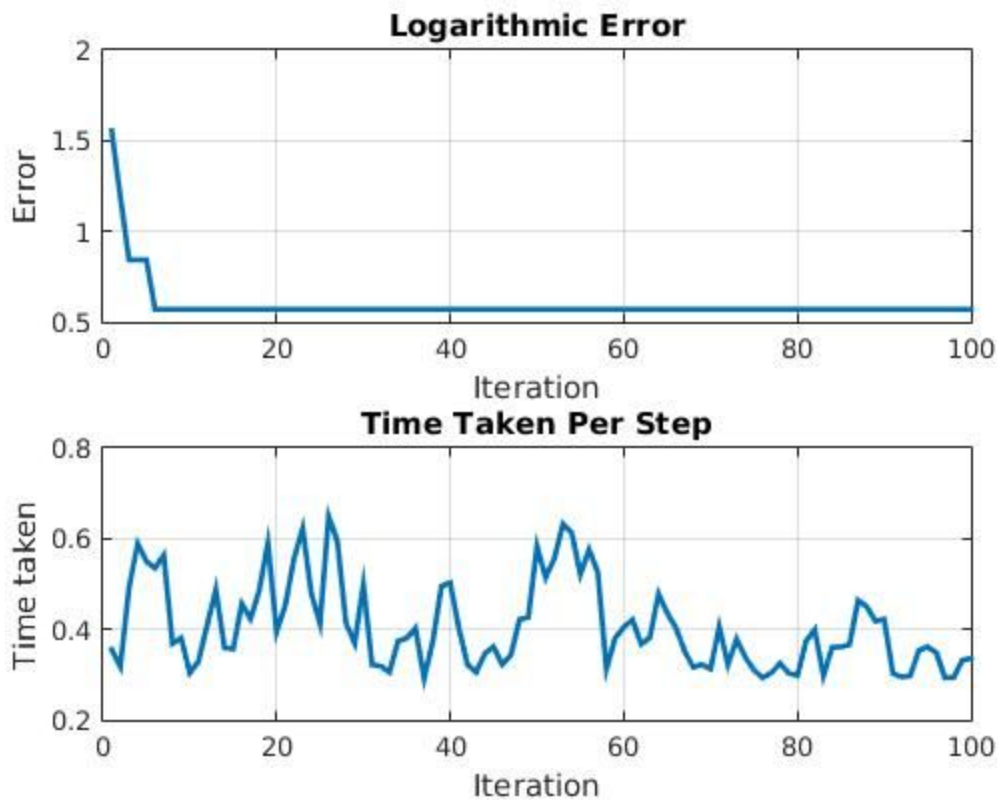
Converging value:

$x = [0.448891; 0.226861; -0.10582; 0.11984; 0.816714; 0.719764; 0.421634; 0.28627; 0.00762297; 0.0804983; 0.31906; 0.123879]$

$F(x) = 5.0566$

Iterations: 100

Time taken : 1.568268 seconds.



Trust-region newton method (Dogleg method):

Starting point:

$x = [0.0413; 0.6432; 0.6756; 0.9006; 0.4818; 0.7941; 0.8919; 0.9035; 0.7755; 0.9288; 0.8659; 0.5903]$

$F(x) = 7.4743$

Converging value:

$x = [0.0465081; 0.0688812; 0.835641; 0.724221; 0.663986; 0.449064; 0.959526; 0.925345; 0.959845; 0.939997; 0.888235; 0.789961]$

$F(x) = 1.7681$

Iterations: 100

Time taken: 36.572336 seconds