
THE UNIVERSITY OF TEXAS
AT AUSTIN

EE381V LARGE SCALE OPTIMIZATION

# Problem Set 4

Edited by LaTeX

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# Part I
# Matlab and Computational Assignment

## 1 Conjugate Gradient Algorithm

**Command** to be executed in matlab:

```
>> x_init = [1 1]'; alpha = 0.3; bta = 0.8;
>> [x, iter, all_costs] = gd_btls(x_init, @func, @func_grad, alpha, bta);
```

**Dump**

```
Iter: 1, Cost: 5.292007e+00, Conv_Rate: 0.106142, gamma: 0.800000
Iter: 44, Cost: 2.559267e+00, Conv_Rate: 1.000000, gamma: 0.000000
Convergence reached!
```

**Minima**

```
x = [-0.3379, -0.0031], obj = 2.559267
```

**Plot**

Figure 1: Conjugate Gradient Algorithm

## 2 Newtons Method

## 3 Central Path

# 4 Larger Linear Program

# 5 Gradient, Conjugate Gradient, Newton and BFGS

## Part II
# Written Problems

# A Codes Printout

## A.1 Conjugate Gradient Algorithm

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%% 1. Conjugate Gradient Algorithm
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

function [x, k, logNorm2] = CGS(M, b)
    k = [];
    logNorm2 = [];


end
```

## A.2 Newtons Method

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%% 2. Newton Method
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

function [x, K, logNorm2] = Newton(m)
    t = 1;
    K = [];
    logNorm2 = [];

    k = 0;

end
```

### A.3 Central Path

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%% 3. Central Path
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

function [x, k, logNorm2] = CP(M, b)
    k = [];
    logNorm2 = [];


end
```

### A.4 Larger Linear Program

### A.5 Gradient and Newton