Table of Contents


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% ECEC-T480 Homework 3
```

Problem 1

```
clear all
clc
% Part a
fprintf('\nComputing the determinant: \n')
matrix = [0 -3 7 2; 1 2 -1 3; 5 -2 0 2];
display(determinant(matrix))

% Part b
fprintf('\nUsing Cramers rule: \n')
D = [0 -3 7; 1 2 -1; 5 -2 0];
Dx = [2 -3 7; 3 2 -1; 2 -2 0];
Dy = [0 2 7; 1 3 -1; 5 2 0];
Dz = [0 -3 2; 1 2 3; 5 -2 2];

x = determinant(Dx)/determinant(D)
y = determinant(Dy)/determinant(D)
z = determinant(Dz)/determinant(D)

% Part c
fprintf('\nUsing Gauss elimination: \n')
a = [0 -3 7; 1 2 -1; 5 -2 0];
b = [2; 3; 2];
display(gauss_elim(a, b))

% Part d
fprintf('\nUsing Gaus-Jordan method: \n')
a = [0 -3 7; 1 2 -1; 5 -2 0];
b = [2; 3; 2];
display(gauss_jordan(a, b))

% Part e
fprintf('\nUsing Gaus-Seidel method: \n')
A = [0 -3 7; 1 2 -1; 5 -2 0];
b = [2; 3; 2];
display(gauss_seidel(A,b, 0.8, 10000))

% Part f
fprintf('\nUsing matinv and mmult: \n')
```

```
matrix = [0 -3 7; 1 2 -1 ; 5 -2 0 ];
b = [2; 3; 2];
display(mmult(matinv(matrix), b))
```

```
Computing the determinant:
   -69


Using Cramers rule:

x =

   -0.9855


y =

   -1.4638


z =

    0.9130


Using Gauss elimination:
    0.9855
    1.4638
    0.9130


Using Gaus-Jordan method:
    0.9855
    1.4638
    0.9130


Using Gaus-Seidel method:
   NaN   NaN   NaN


Using matinv and mmult:
    0.9855
    1.4638
    0.9130
```

Problem 2

```
clear all
clc
% Part a
```

```
fprintf('\nComputing the determinant: \n')
matrix = [3 -2 1 -10; 2 6 4 44; -1 -2 5 -26];
display(determinant(matrix))

% Part b
fprintf('\nUsing Cramers rule: \n')
D = [3 -2 1; 2 6 4; -1 -2 5];
Dx = [-10 -2 1; 44 6 4; -26 -2 5];
Dy = [3 -10 1; 2 44 4; -1 -26 5];
Dz = [3 -2 -10; 2 6 44; -1 -2 -26];

x = determinant(Dx)/determinant(D)
y = determinant(Dy)/determinant(D)
z = determinant(Dz)/determinant(D)

% Part c
fprintf('\nUsing Gauss elimination: \n')
a = [3 -2 1; 2 6 4; -1 -2 5];
b = [-10; 44; -26];
display(gauss_elim(a, b))

% Part d
fprintf('\nUsing Gaus-Jordan method: \n')
a = [3 -2 1; 2 6 4; -1 -2 5];
b = [-10; 44; -26];
display(gauss_jordan(a, b))

% Part e
fprintf('\nUsing Gaus-Seidel method: \n')
A = [3 -2 1; 2 6 4; -1 -2 5];
b = [-10; 44; -26];
display(gauss_seidel(A,b, 0.8, 1000))

% Part f
fprintf('\nUsing matinv and mmult: \n')
matrix = [3 -2 1; 2 6 4; -1 -2 5];
b = [-10; 44; -26];
display(mmult(matinv(matrix), b))
```

```
Computing the determinant:
   144


Using Cramers rule:

x =

    2.3333


y =

    7.6667
```

```
z =

   -1.6667


Using Gauss elimination:
    2.3333
    7.6667
   -1.6667


Using Gaus-Jordan method:
    2.3333
    7.6667
   -1.6667


Using Gaus-Seidel method:
    2.3329    7.6664   -1.6669


Using matinv and mmult:
    2.3333
    7.6667
   -1.6667
```

Problem 3

```
clear all
clc

fprintf('\nUsing LU decomposition: \n')
matrix = [3 -2 1; 2 6 4; -1 -2 5];
b = [-10; 44; -26];
[L, U] = lu_decomp(matrix);
xx = U\(L\b)


Using LU decomposition:

xx =

    2.3333
    7.6667
   -1.6667
```

Problem 4

```
clear all
```

```
clc

fprintf('\nElectrical engineer problem: \n')
a = [15 17 19; 0.3 0.4 0.55; 1 1.2 1.5];
b = [3890; 95; 282];
display(gauss_elim(a, b))
```

```
Electrical engineer problem:
   90.0000
   60.0000
   80.0000
```

Problem 5

```
clear all
clc

fprintf('\nUsed mesh analysis to come up with the system: \n')
a = [-25 0 -4 29; 11 -4 0 -5; -4 9 -5 0; 0 -25 37 -4];
b = [10;0;2;0];
display(gauss_elim(a, b))
```

```
Used mesh analysis to come up with the system:
    1.1568
    1.3219
    1.0540
    1.4875
```

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