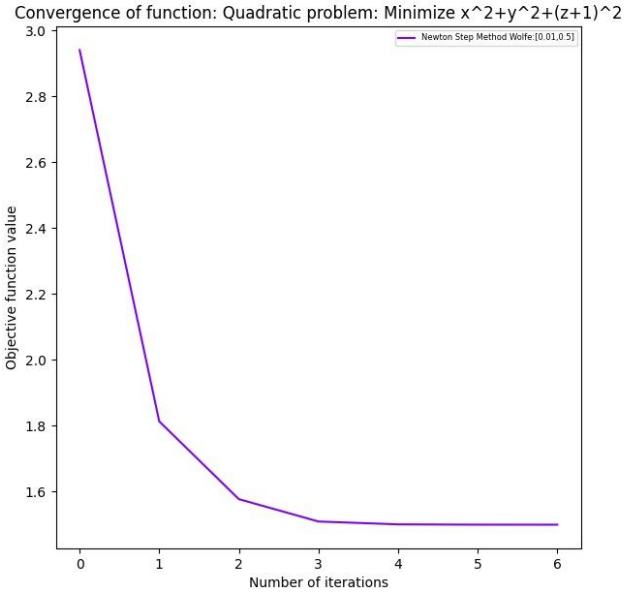
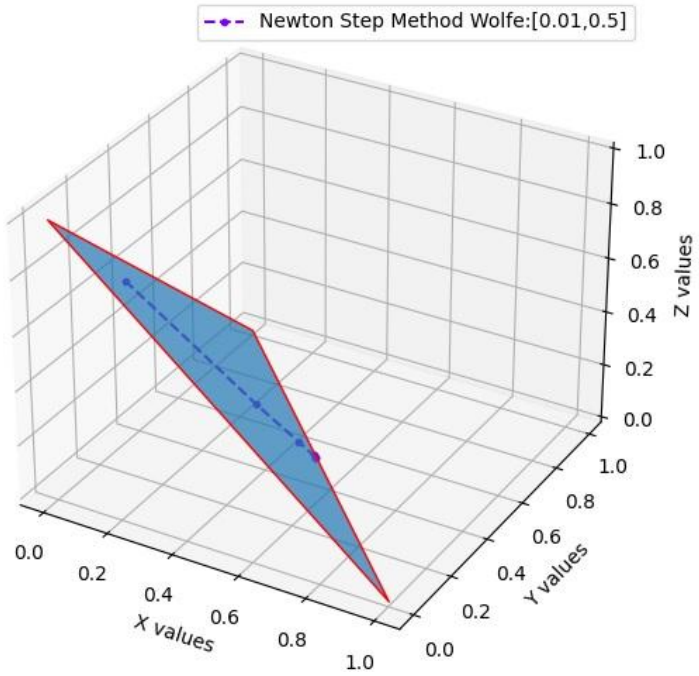
Programming HW2 for Numerical Optimizations

Minimization of quadratic function:

Iteration	Objective	x	y	z	nu
0	2.94	0.1	0.2	0.7	0
1	1.8134	0.38379	0.38379	0.2324081	1.8379594
2	1.5775	0.46492	0.46492	0.0701490	-7.1476268
3	1.5096	0.49523	0.49523	0.0095347	-97.0272734
4	1.5009	0.49950	0.49950	0.0009950	-997.002970
5	1.50009	0.49995	0.49995	0.0000999	-9997.00030
6	1.500009	0.49999	0.49999	9.99949e-06	-999970.0

Optimization reached the target of objective function.
Objective: 1.5000099996498275
Location: [4.99995000e-01, 4.99995000e-01, 9.99949984e-06]
Final nu: -99997.00003002
Equality constraints values: [0.0]
Inequality constraints values: [-0.499995, -0.499995, -9.9994998e-06]

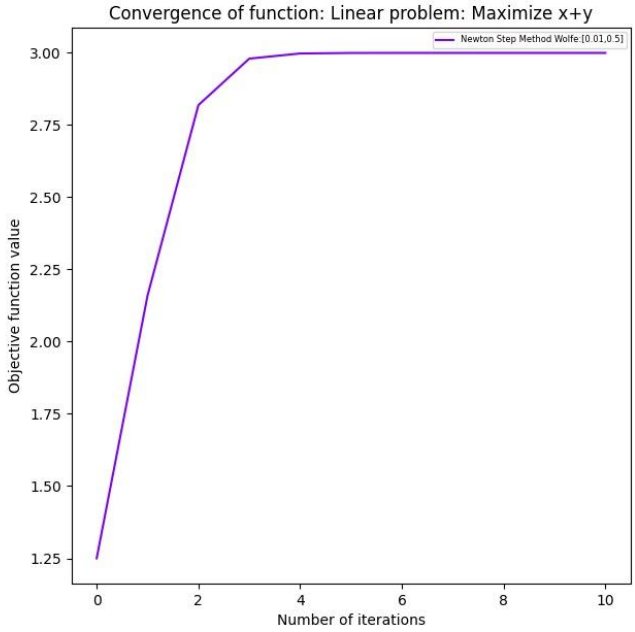

Convergence of function: Quadratic problem: Minimize x^2+y^2+(z+1)^2
Newton Step Method Wolfe:[0.01,0.5]
Objective function value
Number of iterations
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
0
1
2
3
4
5
6

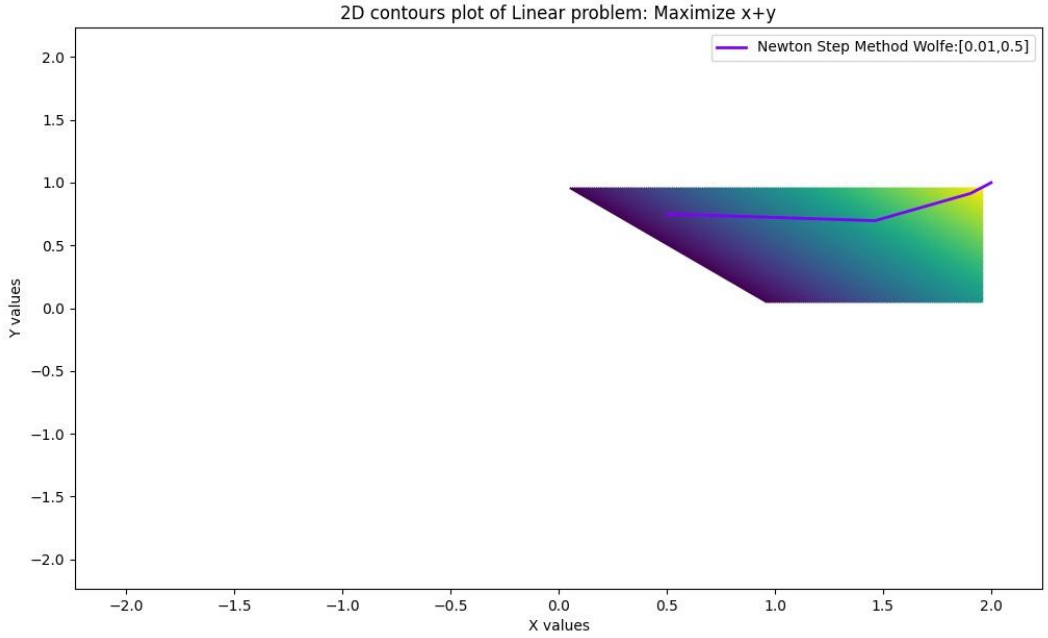

Newton Step Method Wolfe:[0.01,0.5]
X values
Y values
Z values
0.0
0.2
0.4
0.6
0.8
1.0

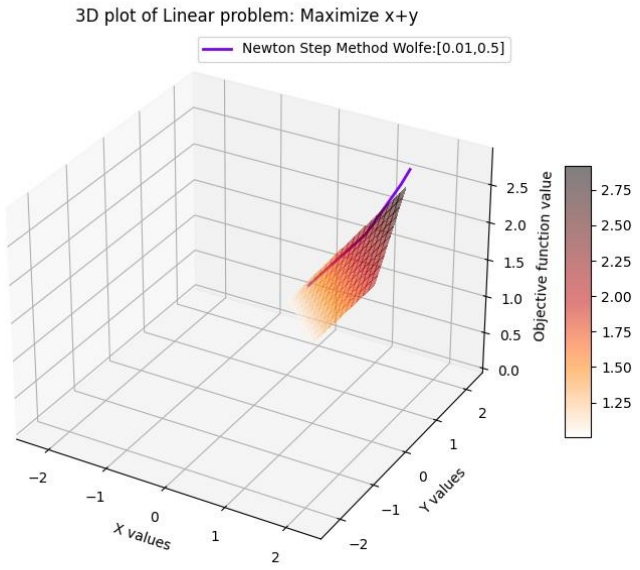
Maximization of linear function:

Iter	Objective	x	y
0	1.25	0.5	0.75
1	2.1597557552	1.46301532	0.69674044
2	2.8193261240	1.90521016	0.91411596
3	2.9801994802	1.99005025	0.99014923
4	2.9980019994	1.9990005	0.9990015
5	2.9998000200	1.99990001	0.99990002
6	2.9999800002	1.99999	0.99999
7	2.9999980000	1.999999	0.999999
8	2.9999998000	1.9999999	0.9999999
9	2.9999999820	1.99999999	0.99999999
10	2.999999999	2.	1.

Optimization reached the target of objective function.
objective: 2.9999999999899005
location: [2., 1.]
Equality constraints values: []
Inequality constraints values: [-1.9999999999899005,
-5.051070672834612e-12, -5.048184092970587e-12,
-0.9999999999949489]


Convergence of function: Linear problem: Maximize x+y
Newton Step Method Wolfe:[0.01,0.5]
Objective function value
Number of iterations
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
0
2
4
6
8
10


2D contours plot of Linear problem: Maximize x+y
Newton Step Method Wolfe:[0.01,0.5]
Y values
X values
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0


3D plot of Linear problem: Maximize x+y
Newton Step Method Wolfe:[0.01,0.5]
Objective function value
X values
Y values