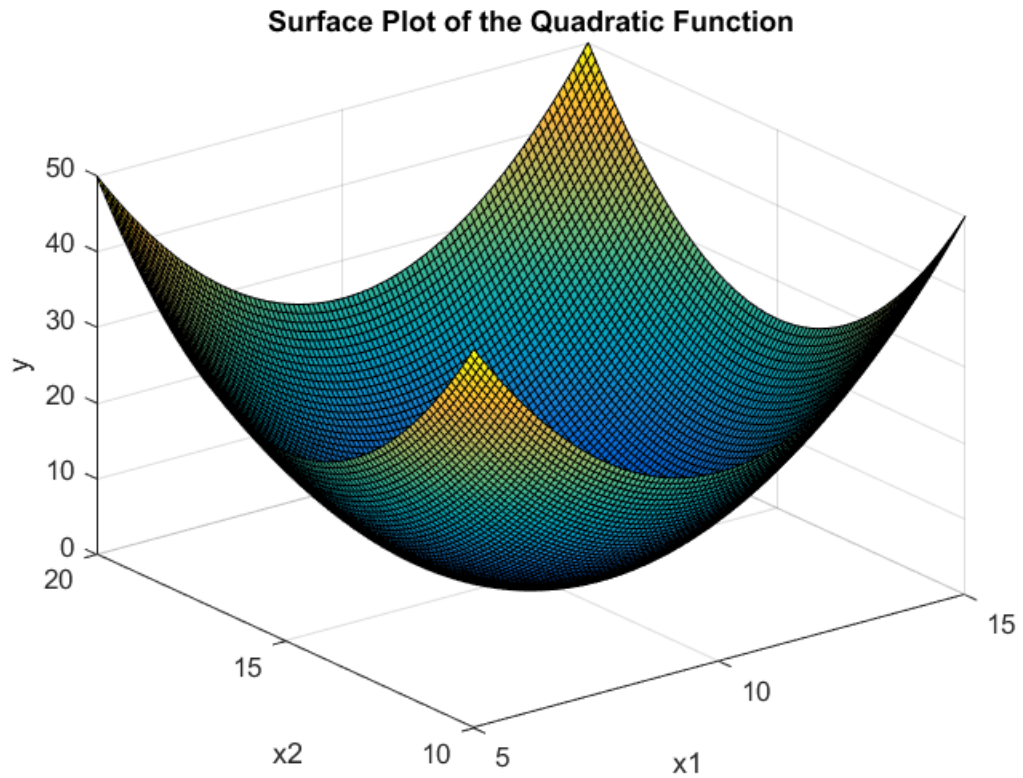# Table of Contents

Surface plotting of the quadratic function disscussed in the class

```
clear all; close all; clc

x1 = [5:0.1:15];
x2 = [10:0.1:20];

yout = [];
for i = 1:length(x1)
    for j = 1:length(x2)
        x = [x1(i) x2(j)];
        y(i,j) = OurQuadraticFunction(x);
    end
end

figure(1);
surf(x1, x2, y)
xlabel('x1')
ylabel('x2')
zlabel('y')
title('Surface Plot of the Quadratic Function')
```

Surface Plot of the Quadratic Function

Optimization of the function using Nelder-Mean Simplex Search algorithm

```
yout = [];
[x_opt y_opt] = fminsearch('OurQuadraticFunction',[15 20]);
figure(2);
plot(yout,'linewidth',2)
xlabel('Number of function evaluations')
ylabel('Cost function value')
title('Optimization of the Quadratic Cost Function')
```

Optimization of the Quadratic Cost Function
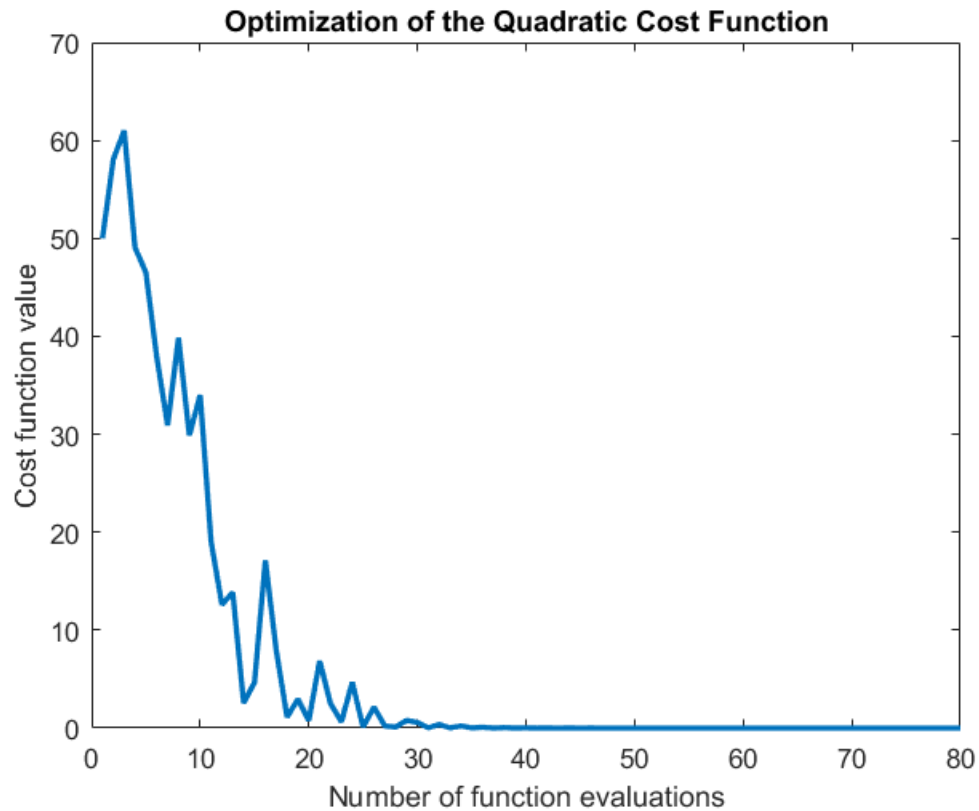
Appendix: Quadratic Function code

function y = OurQuadraticFunction(x) % A function file always starts with this line: function outVar = functionName(inputVar) % Use the same filename as functionName when saving the function file % To access a function, it needs to be either in the Matlab's current % directory or in a directory added to Matlab's path-list

```
yout = evalin('base','yout'); % Reads variable "yout" from the workspac

y1 = (x(1)-10)^2;
y2 = (x(2)-15)^2;
y = y1 + y2;

yout = [yout y]; % Appends the new function evaluation to the previous
assignin('base','yout',yout); % Sends the updated "yout" back to worksp
end
```

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