```
% % This is the part for Problem 1
% % % % This is the part for problem1 subquestion 1


x1 = -10:.01:10;
sigmoid(x1)
plot(x,sig_function);
grid on
% plot(costFunction (0.5, 10, 20));


% parts for running routines for subquestion 3.
functionExample = @cos;
x2 = fminbnd( functionExample, 0 ,10);
disp(x2)
x3 = fminsearch(functionExample,0);
disp(x3)


% % % % The sigmoid method (require extra package "Deep Learning Toolbox")
% % % % Following instructions from slides, and the mathworks instructions
% % % % https://www.mathworks.com/matlabcentral/fileexc
% hange/51007-sigmoid?focused=3876707&s_tid=gn_loc_drop&tab=example

function sigmoid(x)
sig_function = 1./(1+exp(-x));
plot(x,sig_function);
end


% cost function for the log regression
% sig = 1./(1 + (exp(-(X * theta))))
function [J, grad] = costFunction(theta, X, y)
hx = sigmoid(X * theta);
m = length(X);

J = (-y' * log(hx) - (1 - y')*log(1 - hx)) / m;
grad = X' * (hx - y) / m;

end

%Hypothesis function for the log regression.
% if the sigmoid > 0.5, accept, otherwise, reject.

function hypoSig(x)
    if sigmoid (x) > 0.5
        outs = true;
    end
        outs = false;
end
```

```
% % % % This is the part for problem1 subquestion 2
% Find the solution to the classification problem by writing your own
% gradient descent method.
% The slide claimed that "The gradient descent method is the same for both
% linear and logistic regressions!"
%  following instructions provided previously

function gra_dec(Gamma, max_iter, func_tol)
% iteration part
iter = 1;         % iterations counter
x = [0; 0; 0];    % initial guess
fvals(iter) = F(x);
progress(iter, x);
while iter < max_iter && fvals(end) > func_tol
    iter = iter + 1;
    x = x - Gamma * dF(x);  % gradient descent
    fvals(iter) = F(x);     % evaluate objective function
    progress(iter, x);      % show progress
end
% plot part
plot(1:iter, fvals, 'LineWidth',2); grid on;
title('Objective Function'); xlabel('Iteration'); ylabel('F(x)');
end
```

```
% % % % This is the part for problem1 subquestion 2
% Find the solution to the classification problem by using MATLAB
% optimization routines. Did you reproduce we saw in class?
```

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    3.1416
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    3.1416
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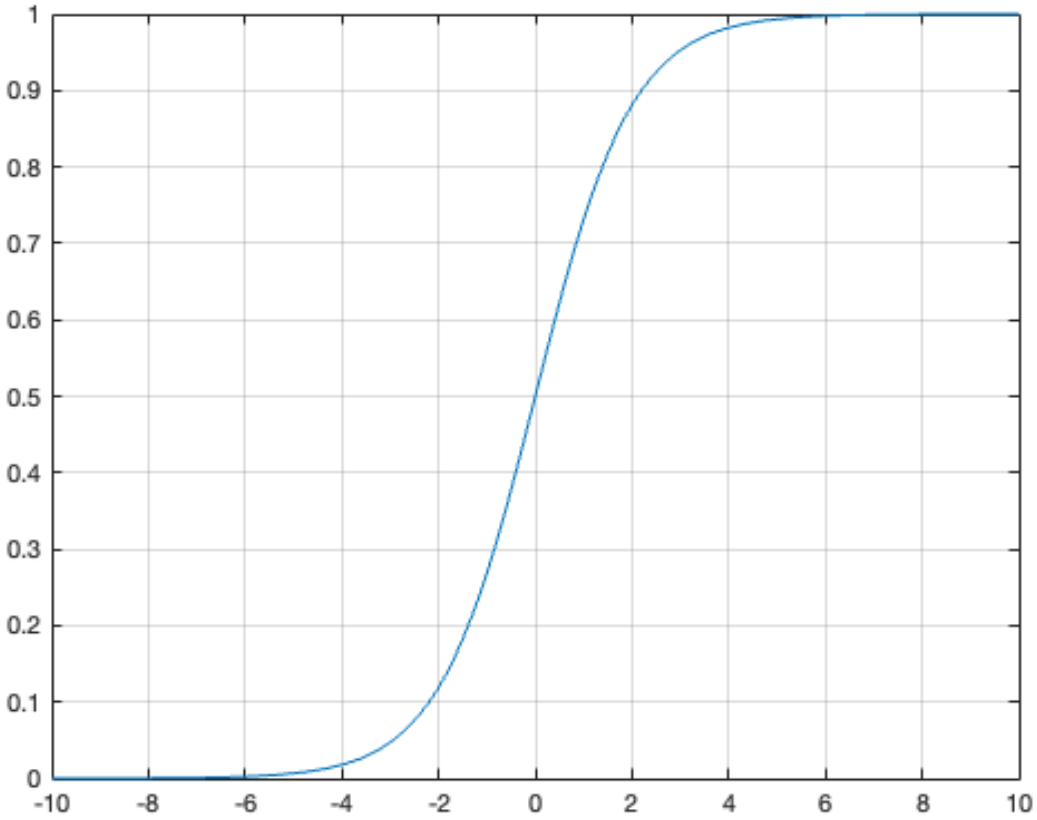

Published with MATLAB® R2022a