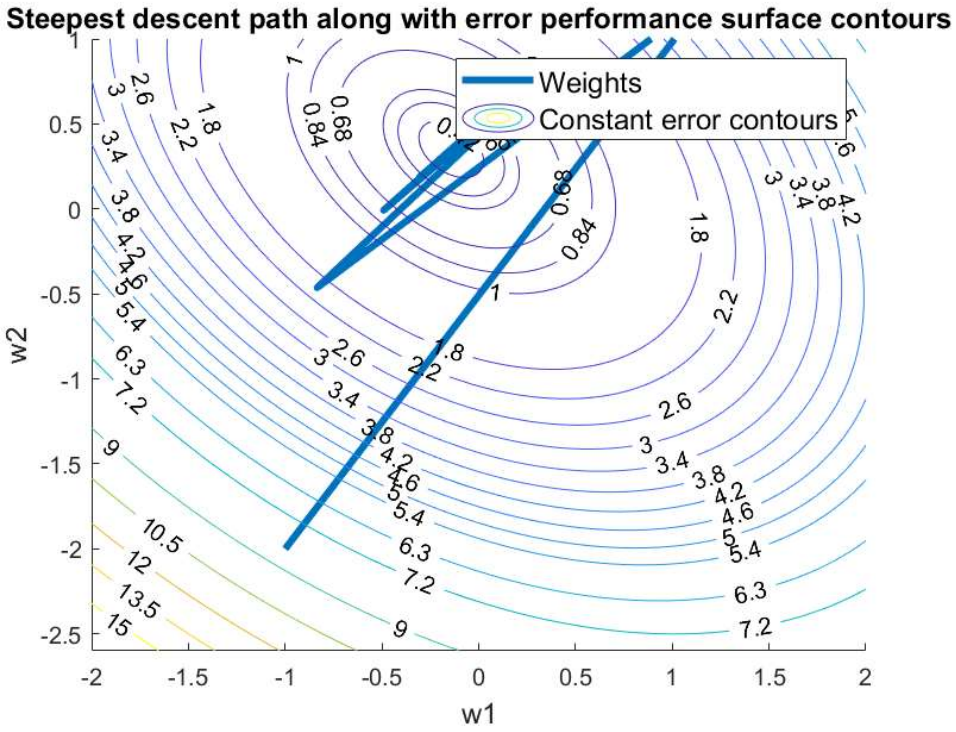
```
R = [ 1  0.4045;0.4045  1];

p = [0; 0.2939];
var_d = 0.5;

wo = R\p;

numIter = 30;
mu = 1.2;

J_hist = zeros(numIter+1, 1);
w_hist = zeros(numIter+1, 2);

w = [-1; -2];
J = var_d - conj(w).'*p - conj(p).'*w + conj(w).'*R*w;

J_hist(1, 1) = J;
w_hist(1,:) = w.';

for k=1:numIter
    w = w + (p - R*w).*mu;
    J = var_d - conj(w).'*p - conj(p).'*w + conj(w).'*R*w;

    J_hist(k+1, 1) = J;
    w_hist(k+1,:) = w.';
end

xl = -2;
xr = 2;
yl = -2.6;
yr = 1;
x = linspace(xl, xr, 1000);
y = linspace(yl, yr, 1000);
[X, Y] = meshgrid(x,y);
J = 0.5 - 2.*p(1).*X - 2.*p(2).*Y + R(1,1).*(X.^2)+R(2,1).*(Y.*X)+R(1,2).*(X.*Y)+R(2,2).*(Y.^2);
levels = [0.38:0.04:0.5, 0.68:0.16:1, 1.8:0.4:5, 5.4:0.9:8, 9:1.5:15];
linewidth = 3;
fontsize = 12;

figure(1)
hold on;
plot(w_hist(:,1), w_hist(:,2), 'LineWidth', linewidth, 'DisplayName','Weights')
contour(X,Y,J,levels,'ShowText','on', 'DisplayName', 'Constant error contours')
legend('FontSize', fontsize);
title('Steepest descent path along with error performance surface contours', 'FontSize', fontsize)
xlabel('w1', 'FontSize',fontsize)
ylabel('w2', 'FontSize',fontsize)
xlim([xl,xr])
ylim([yl,yr])
hold off;
```




```
figure(2)
hold on;
plot(0:numIter, J_hist, 'LineWidth', linewidth)
title('Error vs iteration', 'FontSize',fontsize)
xlabel('Iteration', 'FontSize',fontsize)
ylabel('Error', 'FontSize',fontsize)
hold off;
```