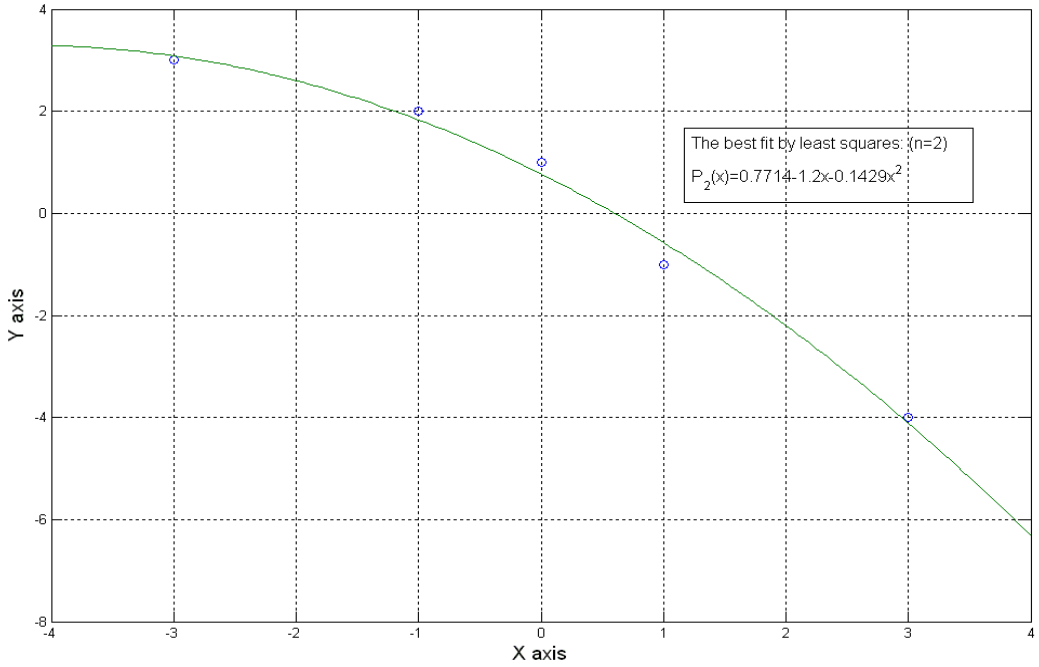
```
% Data Fitting by Least Squares (polynomials)
% Input : x=(x1,...xm)'- x coordinations of data
%         y=(y1,...,ym)' - y coordination of data
% Output: p=(p1,..,pn-1): P(x)=p1+p2x+...pn-1x^(n-2) - the best polynomial
% degree n-2 and plot of the set of data and y=P(x).

function[p]=LeastS(x,y,n)
m=length(x);
for k=1:m
    A(k,1)=1;
    for j=2:n-1
        A(k,j)=x(k)^(j-1);
    end
end
%Solving the normal equation
p=(A'*A)\(A'*y)

%Plotting
for s=1:n-1;
    c(s)=p(n-s);
end
a=x(1)-1;
b=x(m)+1;
w=a:0.05:b;
pw=polyval(c,w);
plot(x,y,'o',w,pw)
grid

% Calculating RMSE
RMSE=0;
for k=1:m
    RMSE=RMSE+(polyval(c,x(k))-y(k))^2;
end
RMSE=sqrt(RMSE/m)
% Similar to polyfit MatLab default command.
```

```
% Set of data: (3,3), (-1,2), (0,1), (1,-1), (3,4).
% Model: y=p1+p2x+p3x^2
clear;
x=[-3;-1;0;1;3];
y=[3;2;1;-1;-4];
n=4;
p=LeastS(x,y,n)
p =
    0.7714
   -1.2000
   -0.1429
RMSE =

    0.2390
```




```
% Model: y=p1+p2x+p3x^2+p4x^3+p4x^4- produces interpolation
n=6;
p=LeastS(x,y,n)
p =
    1.0000
   -1.5417
   -0.5417
    0.0417
    0.0417
RMSE =
  5.9829e-015
```