
Aufgabe 9.42

```
x = (0:8)';
y = [1:5,-3:0]';
z = linspace(0,8,1000);

% a)
pot=(0:8)';
n = length(x);
% a)
M1 = zeros(n,n);
% b)
M2 = zeros(n,n);
% c)
M3_1 = zeros(n,n);
M3_2 = zeros(n,n);

e = inline('exp(-sigma*(x-x_k).^2)','x','x_k','sigma');
dbtype func942_b.m

for j=1:n
    % a)
    M1(j,:) = (x(j)).^pot;
    % b)
    M2(j,:) = func942_b(x(j));
    % c)
    M3_1(j,:) = e(x,x(j),1);
    M3_10(j,:) = e(x,x(j),10);
end

% a)
c1 = M1\y;
c1
% b)
c2 = M2\y;
c2
% c)
c3_1 = M3_1\y;
c3_1
c3_10 = M3_10\y;
c3_10

f1 = [];
f2 = [];
f3_1 = [];
f3_10 = [];

for k=1:length(z)
    % a)
    tmp = c1' * ( (z(k)).^pot);
    f1 = [f1;tmp];
```

```

    % b)
    tmp = c2' * func942_b(z(k));
    f2 = [f2;tmp];

    % c)
    tmp = c3_1' * e(x,z(k),1);
    f3_1 = [f3_1;tmp];

    tmp = c3_10' * e(x,z(k),10);
    f3_10 = [f3_10;tmp];

end

plot(x,y,'o',z,f1,z,f2,z,f3_1,z,f3_10)
legend('Daten','Monome','Huetchen','sigma = 1','sigma = 10');
axis([0,8,-14,6])

1    function vecu=func942_b(x)
2    vecu = zeros(8,1);
3
4    for k=0:8
5        if k == 0
6            if (x>=0 && x<1)
7                u=1-x;
8            else
9                u=0;
10           end
11        elseif k == 8
12            if (x>=7 && x<=8)
13                u = x-7;
14            else
15                u = 0;
16            end
17        else
18            if (x>=k-1 && x<k)
19                u = x-(k-1);
20            elseif (x>=k && x<k+1)
21                u = k+1-x;
22            else
23                u=0;
24            end
25        end
26    end
27    vecu(k+1) = u;
28
29    end
30

c1 =

    1.0000
   -66.9607
   170.2187

```

```
-162.7812
  78.6328
-21.0125
  3.1406
 -0.2455
  0.0078
```

Warning: Matrix is singular to working precision.

c2 =

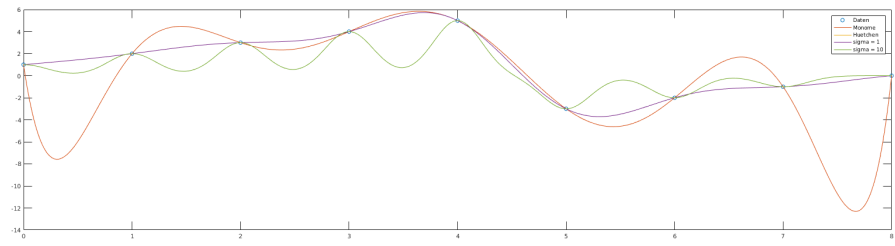
```
Inf
NaN
NaN
NaN
NaN
NaN
NaN
NaN
NaN
NaN
```

c3_1 =

```
0.6137
0.9387
2.2295
0.7924
6.7215
-5.6012
0.3683
-1.1929
0.4328
```

c3_10 =

```
0.9999
1.9998
2.9997
3.9996
5.0000
-3.0001
-1.9998
-0.9999
0.0000
```



Published with MATLAB® R2016a