Matlabintro

Pølse

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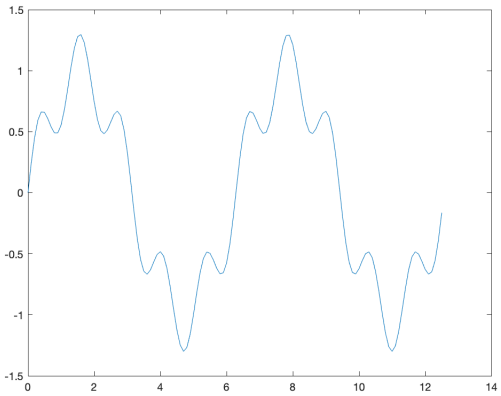
1 Introduktion till Matlab

1. $A = \pi r^2$
   $r = 4$
   $A = \pi * 4^2 = 16\pi = 50.2655$

2. 


3. ```
   s=0;
   for i=1:5
       s=s+(i^2);
   end
   disp("Sum is")
   disp(s)
   ```

4. -0.8241 & 0.8241

5. (a) y = linspace(x1,x2,n) generates n points. The spacing between the points is (x2-x1)/(n-1).
   y = linspace(x1,x2) returns a row vector of 100 evenly spaced points between x1 and x2.

   (b) gg ez
   ```

2 Kontrollstrukturer och funktioner i Matlab

1.
```
if a<b
    c=a
else
    c=b
end
```

2. (a) 36569 iterations
   (b) 0.785148163459949

3.
```
function Omkrets=polylen(x,y)
    n=length(x);
    Omkrets=0;
    for i=1:n-1
        Omkrets=Omkrets+sqrt((x(i+1)-x(i))^2+(y(i+1)-y(i))^2);
    end
```

4.
```
subplot(1,2,1)
axis([-1 1 -2 2])

[x,y]=ginput;
x=[x; x(1)];
y=[y; y(1)];

plot(x,y,"-o")
axis([-1 1 -2 2])

subplot(1,2,2)
fill(x,y,"g")
axis([-1 1 -2 2])
```

3 Matriser och vektorer i Matlab

1. ```
   A=[1 4 7 10; 2 5 8 11; 3 6 9 12];
   B=[4 5 6; 3 2 1; 1 1 1];
   C=[1; 3; 5];
   D=[0 2 4];
   ```

   (a) ```
   A=[A(:,1:2) c A(:,3:4)];
   B=[B(1,:); d; B(2:3,:)];
   ```

   (b) ```
   A=[A(3,:); A(2,:); A(1,:)];
   A=[A(:,1) A(:,4) A(:,3) A(:,2) A(:,5)];
   ```

2. ```
   b1=[4; 3; 1];
   b2=[5; 2; 1];
   b3=[6; 1; 1];

   B=[b1 b2 b3];
   ```

3. ```
   A=[10 7 8 7; 7 5 6 5; 8 6 10 9; 7 5 9 10];

   A11=A([1 2],[1 2]);
   A12=A([1 2],[3 4]);
   A21=A([3 4],[1 2]);
   A22=A([3 4],[3 4]);

   A=[A11 A12; A21 A22];
   ```

4. ```
   A=[11 4 3 7; 2 6 8 5; 9 12 1 10];
   b=[3; 1; 5];
   c=[4 2 8 0 6];

   size(b); % 3, 1
   size(c); % 1, 5
   % b har endast en kolonn -> kolonnvektor
   % c har endast en rad -> radvektor

   [v,i]=max(A);
   [max_el,j_max]=max(v);
   i_max=i(j_max);
   % största elementet är 12 och finns på (3,2)

   [v,i]=min(A);
   [min_el,j_min]=min(v);
   ```

```
i_min=i(j_min);
% minsta elementet är 1 och finns på (3,2)
```

5.
```
t=1:5;
v=t .^ 2;
s=sum(v);

v=[1:5] .^ 2;
s=sum(v);

t=1:5;
s=sum(t .^ 2);

s=sum([1:5] .^ 2);
```

6.
```
A=[1 5 9; 2 6 10; 3 7 11; 4 8 12];
B=[4 5 6; 3 2 1; 1 1 1];
x=[1; 1; 1];
a=[-1 0 1];

Ax=A*x; % Ax=[15; 18; 21; 24]
Bx=B*x; % Bx=[15; 6; 3]
AB=A*B; % AB=[28 24 20; 36 32 28; 44 40 36; 52 48 44]
ax=a*x; % ax=[0]
xa=x*a; % xa=[-1 0 1; -1 0 1; -1 0 1]
aB=a*B; % aB=[-3 -4 -5]

[m,n]=size(A);
p=size(x,2);
C=zeros(m,p);
for i=1:m
    for j=1:p
        cij=0;
        for k=1:n
            cij=cij+A(i,k)*x(k,j);
        end
        C(i,j)=cij;
    end
end
```

7.
```
A=[1 0 0; 0 1 0; 1 0 1];
B=[1 0 0; -2 1 0; 0 0 1];
C=[2 1 1; 4 1 0; -2 2 1];
```

(a) `isequal(A*(B*C), (A*B)*C);` % -> *True*
`isequal(A*(B+C), A*B+A*C);` % -> *True*
`isequal((B+C)*A, B*A+C*A);` % -> *True*

(b) `isequal(A*C, C*A);` % -> *False*
`isequal(B*C, C*B);` % -> *False*
`isequal(A*B, B*A);` % -> *True*