Çankaya University
Department of Computer Engineering

CENG 290 - Data Communications

24.02.2015

LABWORK 0

RandBin

```
function x = randbin(n)
%Produce a random binary vector of length n

x=zeros(1,n);
for i = 1:n
    if rand()>0.5
        x(i) = 1;
    end
end
end
```

AllZeros

```
function z = AllZeros( v )
%If row vector v consists of zeros, return 0
%Else, return 1

n = size(v,2);
z = 0;
for i = 1:n
    if v(i) ~= 0
        z = 1;
        break
    end
end
end
```

MyAngle

```
function t = MyAngle( A,B )
%Angle between two vectors

if size(A,1) ~= 1 ||  size(B,1) ~= 1
    error('Use vectors, not matrices');
end

if size(A,2) ~= size(B,2)
    error('Use vectors of equal size');
end

d = 0;
for i = 1:size(A,2)
    d = d + A(i) * B(i);
end

t = acos(d/(MyLength(A) * MyLength(B)));

end
```

MyLength

```
function d = MyLength( A )
%Length of a vector

n = size(A,2);
d = 0;
for i = 1:n
    d = d + A(i)^2;
end

d = sqrt(d);

end
```

MyProduct

```
function C = MyProduct( A,B )
%Matrix Product

[p,q] = size(A);
[q1,r] = size(B);

if q ~= q1
    error('Number of columns of the first matrix must be equal to
the number of rows of the second matrix');
end

C = zeros(p,r);

for i = 1:p
    for j = 1:r
        for k = 1:q
            C(i,j) = C(i,j) + A(i,k) * B(k,j);
        end
    end
end

end
```

ZerosToBottom

```
function B = ZerosToBottom( A )
%Put all rows of the matrix that consists
%of zeros to the bottom

[p,q] = size(A);
z = zeros(1,q);

counter = 0;
B=[];
for i = 1:p
    if(AllZeros(A(i,:)) == 1)
        B = [B;A(i,:)];
    else
        counter = counter + 1;
    end
end

if counter ~= 0
    for i = 1: counter
        B=[B;z];
    end
end

end
```