
MATLAB programming course for beginners, supported by Wagatsuma Lab@Kyutech

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Specifications and requirements

1. @Time : 2022-8-10
2. @Author : Hiroaki Wagatsuma
3. @Site : https://github.com/hirowgit/1A1_matlab_intermediate_course
4. @IDE : MATLAB R2022a
5. @File : lec0b_step2.m

Main program

```
NofD=5;  
maxD=5;  
  
rM=rand(NofD,NofD);  
  
binaryM=(rM>0.5);
```

```
disp('binaryM');
disp(binaryM);
key=find(~binaryM);

doubleM=double(binaryM);
doubleM(key)=3;
disp('doubleM');
disp(doubleM);

intM=floor(rM*maxD)+1;
disp('intM');
disp(intM);

key=find(intM<5);
intM2=intM;
intM2(key)=0;
disp('intM2');
disp(intM2);

s_intM=sort(intM);
disp('s_intM');
disp(s_intM);

% s_intM=[
%     1     2     1     1     2
%     3     2     2     1     4
%     4     2     2     2     4
%     4     2     3     2     4
%     4     2     4     5     5];

% s_intM=[
%     1     2     1     1     1
%     2     3     2     2     1
%     2     3     3     2     1
%     4     5     3     2     3
%     5     5     5     2     5];

% s_intM=[
%     1     1     1     1     1
%     1     2     1     2     3
%     1     2     1     3     5
%     1     4     3     4     5
%     1     5     4     5     5];
% disp(s_intM);

dM=diff(s_intM);

[ki kj]=find(dM>0);

LackNum=setdiff([1:NofD],unique(kj));

sM=sortrows([zeros(length(LackNum),1); ki] [LackNum';kj]],2);
```

```
ki=sM(:,1); kj=sM(:,2);

mD=max(max(dM));
ti2=[]; tj2=[];
for i=2:mD
    [ti tj]=find(dM==i);
    if ~isempty(ti)
        sM=sortrows([[ repmat(ti,[i-1,1]);ti2] [ repmat(tj,[i-1,1]);tj2]],2);
        ti2=sM(:,1); tj2=sM(:,2);
    end

end

if ~isempty(ti2)
    sM=sortrows([[ti2; ki] [tj2; kj]],2);
    ki=sM(:,1); kj=sM(:,2);
end

sect_id=[0 find(diff(kj)>0)' length(kj)];
sect=[sect_id(1:end-1)+1; sect_id(2:end)];
sect_eg=mat2cell(sect',ones(1,NofD),2);

sect_data=cellfun(@(x) sort(ki(x(1):x(2))),sect_eg,'UniformOutput',false);
key=cell2mat(cellfun(@(x) length(x)<=1,sect_data,'UniformOutput',false));
key2=find(key);
key3=key2(cell2mat(sect_data(key))==0);
if sum(key3)>0
    sect_data(key3)={[]};
end

NofE_data=cellfun(@(x) diff([0 x' NofD]),sect_data,'UniformOutput',false);
zeroS=cell(size(NofE_data));
zeroE=cell(size(NofE_data));

keyL=find(cell2mat(cellfun(@(x)
    length(x)<maxD,NofE_data,'UniformOutput',false)));
if ~isempty(keyL)
    terM=cell2mat(sect_eg(keyL));

    terM1=terM(:,1);
    trNum=mat2cell(s_intM(1,kj(terM1))',ones(1,length(kj(terM1))));
    zeroS(kj(terM1))=cellfun(@(x) zeros(1,x-1),trNum,'UniformOutput',false);

    trNum=mat2cell(s_intM(NofD,kj(terM1))',ones(1,length(kj(terM1))));
    zeroE(kj(terM1))=cellfun(@(x) zeros(1,NofD-
x),trNum,'UniformOutput',false);

    NofE_data2=cellfun(@(x,y,z) [x, y,
    z],zeroS,NofE_data,zeroE,'UniformOutput',false);
else
    NofE_data2=NofE_data;
end

NofE_data_m=cell2mat(NofE_data2);
```

binaryM

0	1	1	1	1
0	1	1	0	1
0	1	0	1	0
1	1	0	1	0
0	1	0	1	1

doubleM

3	1	1	1	1
3	1	1	3	1
3	1	3	1	3
1	1	3	1	3
3	1	3	1	1

intM

1	4	4	4	4
1	4	5	2	3
1	3	3	4	3
4	4	1	4	3
3	5	1	3	5

intM2

0	0	0	0	0
0	0	5	0	0
0	0	0	0	0
0	0	0	0	0
0	5	0	0	5

s_intM

1	3	1	2	3
1	4	1	3	3
1	4	3	4	3
3	4	4	4	4
4	5	5	4	5

Supplementary information to publish

If you want to make a pdf or html file on the code, you can use the code "x_publish_each_codes.m" in the same folder. Please change the file name as " this_file_tag='lec*_step*' " (* will be replaced to the number of the target file).

The code "x_publish_all_codes.m" works for such a publication applying to all codes in the same folder (Note: "x_publish_all_codes_sub.m" should be located in the same folder).

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