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

## Table of Contents

Specifications and requirements .....	1
Main program .....	1
Supplementary information to publish .....	5

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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](https://github.com/hirowgit/1A1_matlab_intermediate_course)
4. @IDE : MATLAB R2022a
5. @File : lec1\_step7.m

## Main program

```
% a generator of the natural number sequence randomly aligned  
  
tic  
NofD=100;  
% NofD=200;
```

```
% NofD=300;

setN=NofD*20;
allData=[];
for k=1:setN

    flag=true(1,NofD+1);

    DataLine=[];
    tmp=floor(rand(1,1)*NofD)+1;

    while sum(flag(1:NofD))>0
        if flag(tmp)
            DataLine(end+1)=tmp;
            flag(tmp)=false;
        end
        tmp=floor(rand(1,1)*NofD)+1;
    end
    allData(k,:)=DataLine;
end

% allData=allData*10;

allData_s=sort(allData);

allData_d=diff(allData_s);

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

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);

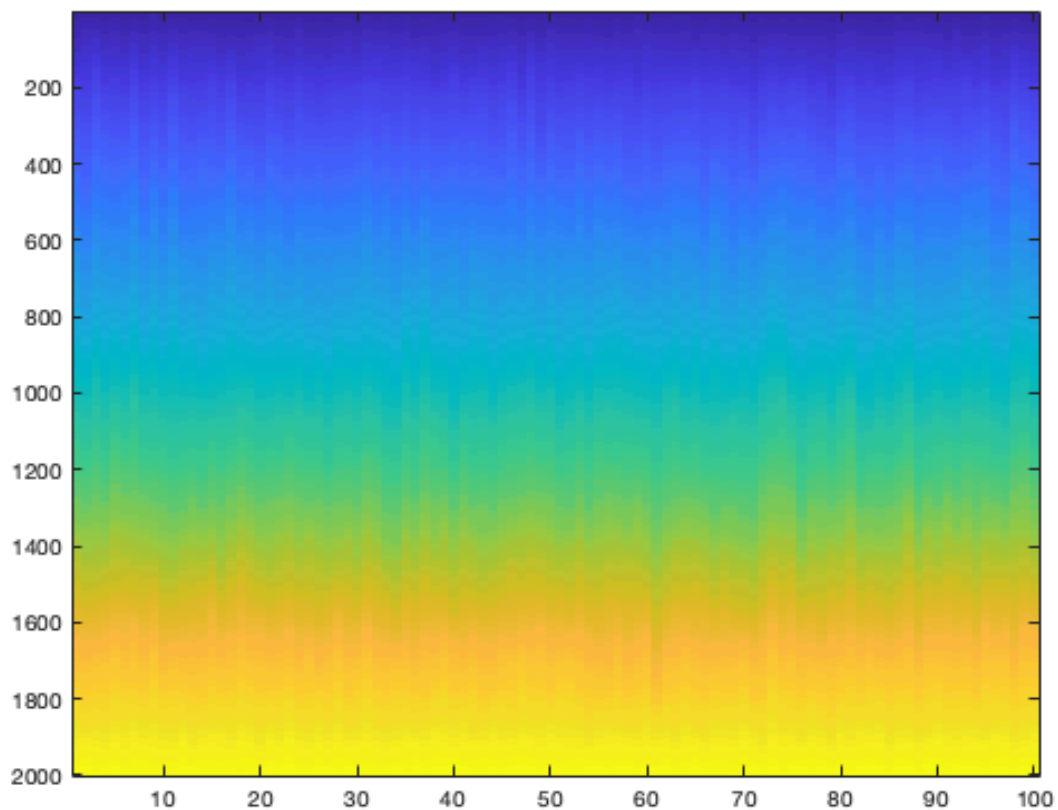
% sect_node=cellfun(@(x) kj(x(1):x(2)),sect_eg,'UniformOutput',false);
sect_data=cellfun(@(x) ki(x(1):x(2)),sect_eg,'UniformOutput',false);
NofE_data=cellfun(@(x) diff([0 x' setN])/
setN,sect_data,'UniformOutput',false);
NofE_data_m=cell2mat(NofE_data);

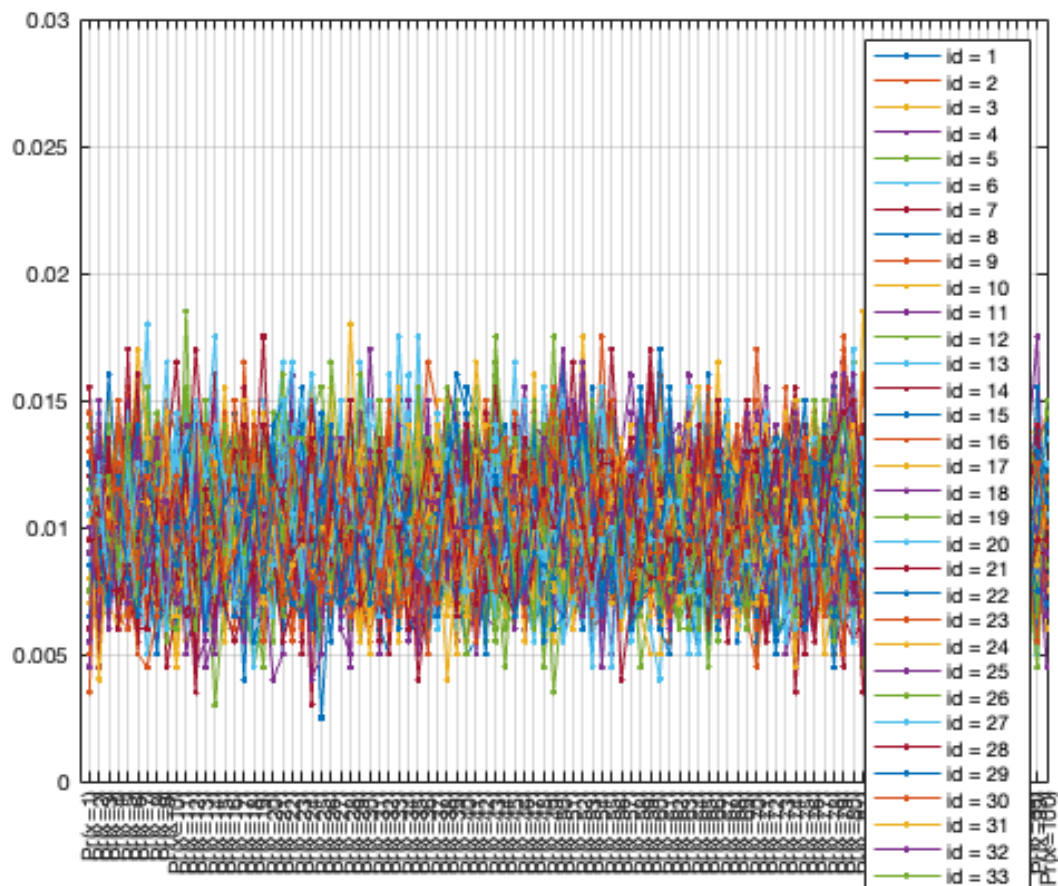
figure(1); clf;
imagesc(allData_s);

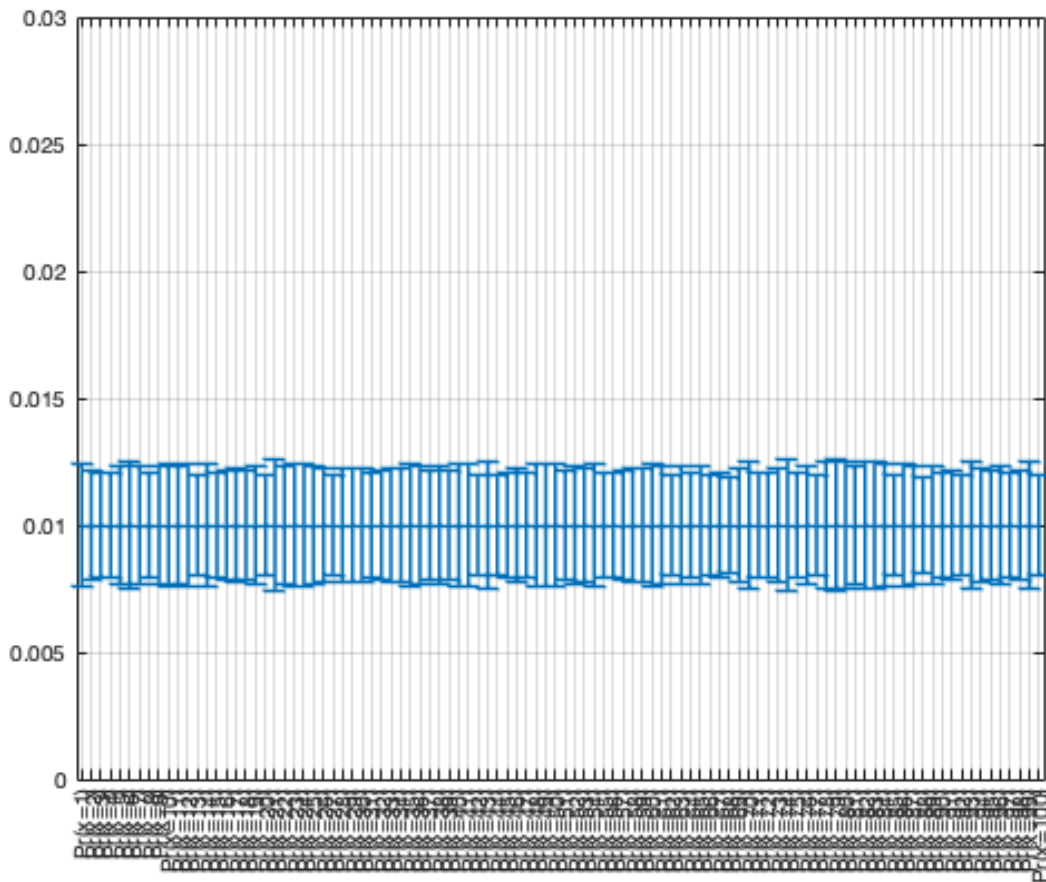
figure(2); clf;
% for k=1:NofD
%     plot(NofE_data{k},'.-'),hold on;
% end
plot(NofE_data_m','.-')
grid on;
xp=1:NofD;

set(gca,'ylim',[0 1],'ylim',[0 mean(mean(NofE_data_m))*3]);
str_lg=cellfun(@(x) ['id = ',num2str(x)],num2cell(xp),'UniformOutput',false);
legend(str_lg);
xticks(xp);
```

```
str_xtk=cellfun(@(x)  
    ['Pr(x=',num2str(x),')'],num2cell(xp),'UniformOutput',false);  
xticklabels(str_xtk);  
  
figure(3); clf;  
meanD = mean(NofE_data_m);  
errD = std(NofE_data_m);  
errorbar(xp,meanD,errD,'LineWidth',1.5,'MarkerSize',32);  
set(gca,'xlim',[0.5 NofD+0.5],'ylim',[0 mean(meanD)*3]);  
grid on;  
xticks(xp);  
xticklabels(str_xtk);
```







## 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).

*Published with MATLAB® R2022a*