Matlab 科学计算

语言及应用

21221 学期

第 4 次

实验报告

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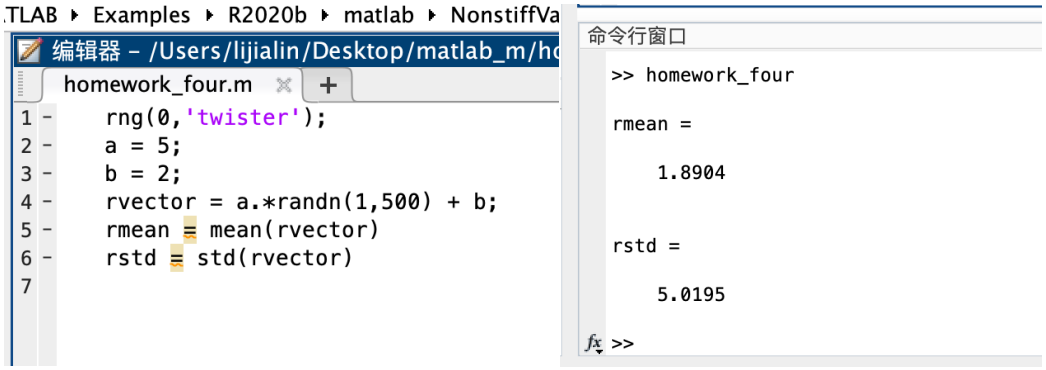
题目：1 Random variables.

代码：

```
rng(0,'twister');
a = 5;
b = 2;
rvector = a.*randn(1,500) + b;
rmean = mean(rvector)
rstd = std(rvector)
```

实验结果及分析：

实验结果发现随机数组的均值和标准差分别趋近于 2 和 5，但不完全相同。



题目：2 Flipping a coin.

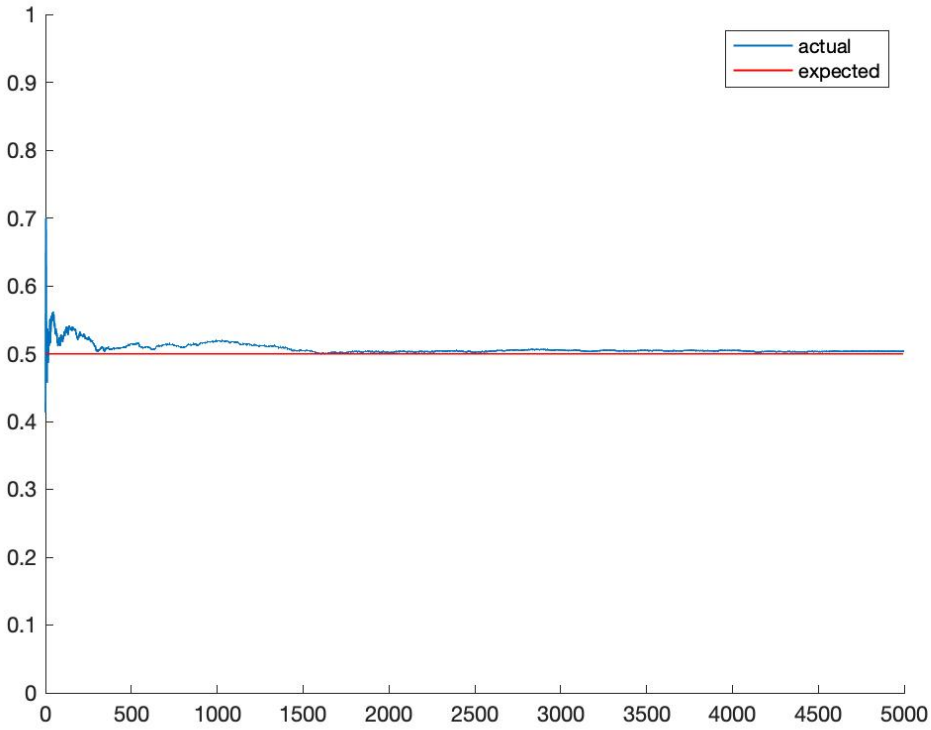
代码：

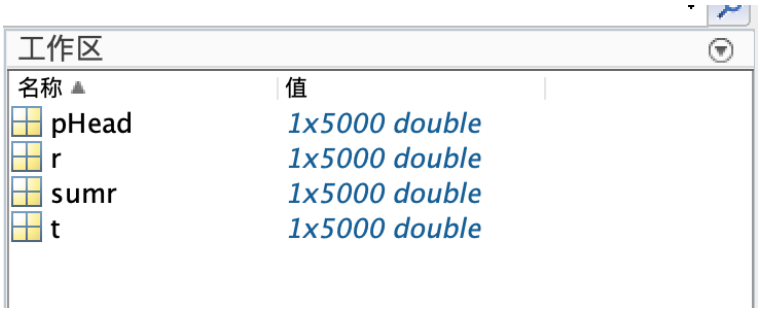
```
clf;clear;
hold on
t = 1:5000;
r = rand(1,5000);
sumr = cumsum(r);
pHead = sumr./t;
plot(t,pHead,'LineWidth',1)
plot(t,0.5*ones(1,5000),'r','LineWidth',1)
ylim([0 1])
legend('actual','expected')
```

实验结果及分析：

硬币的 5000 次抛出显示抛出次数较少时，得到的总抛出不稳定，大致 1500

此后结果趋于稳定。





题目：3 Histogram.

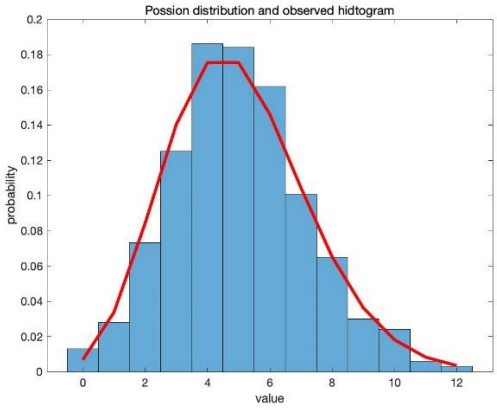
代码：

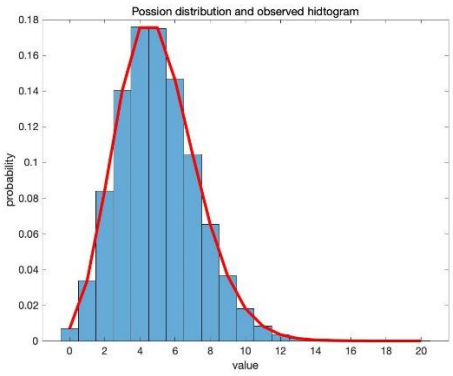
```
clf;clear;
v = poissrnd(5,1,1000);
% v = poissrnd(5,1,1000000);
histogram(v,'Normalization','probability')
hold on
y = poisspdf(min(v):max(v),5);
plot(min(v):max(v),y,'r','LineWidth',3)
```

```
title('Possion distribution and observed hidtogram')
xlabel('value')
ylabel('probability')
```

实验结果及分析：

两者趋势相同，当取 1000000 个样本时（右图），实际与理论几乎相同。





题目：4 Practice with cells.

代码：

```
cellProblem =
{'Joe','Smith',30000;'Sarah','Brown',150000;'Par','Jackson',120000};
disp(cellProblem)
cellProblem{2,2} = 'Meyers';
disp(cellProblem)
cellProblem{3,3} = cellProblem{3,3} + 50000;
disp(cellProblem)
```

实验结果及分析：

输出结果正确

```
命令行窗口
    {'Joe'  }    {'Smith'  }    {[ 30000]}
    {'Sarah'}    {'Brown'  }    {[150000]}
    {'Par'  }    {'Jackson'}    {[120000]}

    {'Joe'  }    {'Smith'  }    {[ 30000]}
    {'Sarah'}    {'Meyers' }    {[150000]}
    {'Par'  }    {'Jackson'}    {[120000]}

    {'Joe'  }    {'Smith'  }    {[ 30000]}
    {'Sarah'}    {'Meyers' }    {[150000]}
    {'Par'  }    {'Jackson'}    {[170000]}

fx >>
```

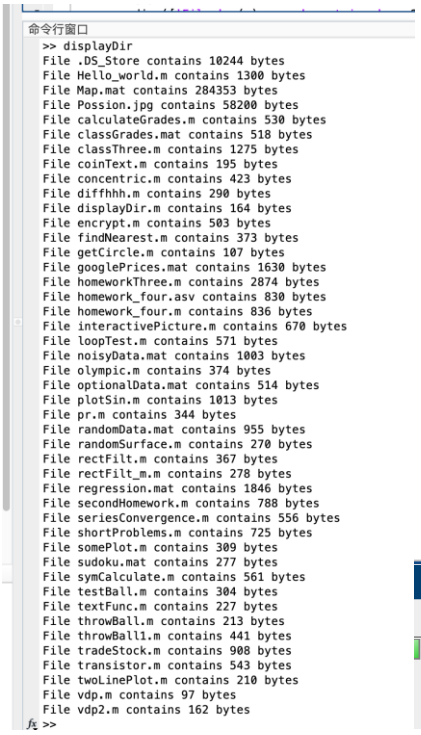
题目：5 Using Structs.

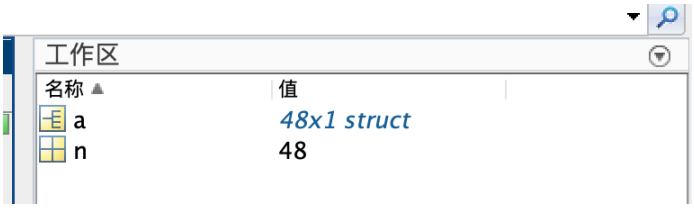
代码：

```
function displayDir()
a = dir;
for n=1:size(a)
    if a(n).isdir == 0
        disp(['File ' a(n).name ' contains ' num2str(a(n).bytes) '
bytes'])
    end
end
end
```

实验结果及分析：

a 为大小为 48*1 的 struct，name 为文件名





题目：Optional Homework Assignments 6 Handles.

代码：

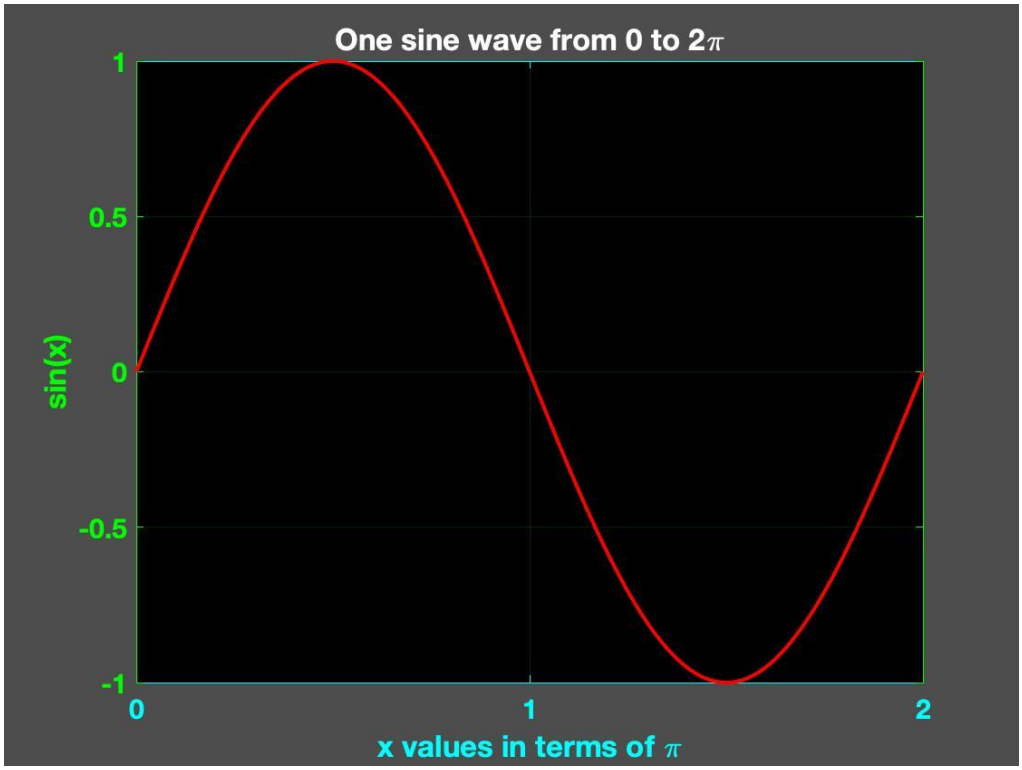
x = linspace(0,2*pi,1000);

y = sin(x);

```
figure
plot(x,y,'r','LineWidth',1)
xlim([0 2*pi])
set(gca,'xtick',[0 pi 2*pi],'xticklabel',{'0','1','2'},'ytick',-
1:.5:1,'ycolor','g','xcolor','c','color','k')
set(gcf,'color',[.3 .3 .3])
title('One sine wave from 0 to
2\pi','fontsize',14,'fontweight','b','color','w')
xlabel('x values in terms of \pi','fontsize',12,'color','c')
ylabel('sin(x)','fontsize',12,'color','g')
grid on
```

实验结果及分析：

图表样式符合要求



题目： Optional Homework Assignments 7. Image processing.

代码：

```
function im=displayRGB(filename)
[X,cmap] = imread(filename);
sz = size(X);
X = double(X);
X800 = zeros(800,800,3);
[X1,Y1] = meshgrid(linspace(1,sz(1),800),linspace(1,sz(2),800));
[a,b] = meshgrid(1:sz(1),1:sz(2));
X800(:,:,1) = interp2(a,b,X(:,:,1),X1,Y1);
X800(:,:,2) = interp2(a,b,X(:,:,2),X1,Y1);
X800(:,:,3) = interp2(a,b,X(:,:,3),X1,Y1);
X800 = double(X800);
r = X800;
g = X800;
b = X800;
r(:,:,2) = 0;
r(:,:,3) = 0;
g(:,:,1) = 0;
g(:,:,3) = 0;
b(:,:,1) = 0;
b(:,:,2) = 0;
```

```
im = zeros(1600,1600,3);

im(1:800,1:800,:) = X800;

im(801:1600,1:800,:) = g;

im(801:1600,801:1600,:) = b;

im(1:800,801:1600,:) = r;

im = uint8(im);

end
```

实验结果及分析：

图像处理结果符合题设