

# Matlab 绘图手册

v1.0

武汉大学

卫星精密定轨与导航增强团队

郑佳伟

2022 年 06 月 03 日

# 修改记录

日期	描述	人员
2022.06.03	初始文档	郑佳伟

郑佳伟

# 目录

1 绪论 .....	1
2 代码测试软硬件环境 .....	2
3 基本绘图命令 .....	3
4 绘制子图 .....	5
5 绘图属性常用选项汇总 .....	8
6 双轴图 .....	11
7 柱状图 .....	13
8 散点图 .....	14
9 天空图 .....	15
10 热力图 .....	16
11 对数坐标、图中图 .....	17
12 等高线图 .....	18
13 自动生成可区分的颜色、多图例 .....	19
14 动图 gif .....	20
15 三维曲面 .....	21
16 三维曲线 .....	22
17 直方图 .....	23
18 直线箭头 .....	25
19 曲线箭头 .....	26
20 误差棒 .....	27
21 文字云 .....	28

# 1 绪论

SCI 论文，是指被科学引文索引(Scientific Citation Index, SCI)所收录的 SCI 期刊上刊登的学术期刊论文。作为记录和分享研究成果的一种主要载体，增强 SCI 论文的可读性有助于提高研究成果的影响范围和速度。

一个精致的插图往往胜似千言万语。SCI 论文里的插图是给读者最直观的论文信息，是最能明了的反映论文结果的形式。插图是论文的画龙点睛之笔，好的插图会让论文增色不少。

本文档为 MATLAB 绘制 SCI 论文图件的入门教程，基本涵括了测绘领域所涉及的各种类型图件。教程目录如下：

- 基本绘图命令
- 绘制子图
- 绘图属性常用选项汇总
- 双轴图
- 柱状图、散点图
- 天空图、热力图
- 对数坐标、图中图、等高线图
- 自动生成可区分的颜色、多图例、动图 gif
- 三维曲面、三维曲线
- 直方图
- 直线箭头、曲线箭头

具体教程内容和代码也已上传到微信公众号。

微信公众号名称：珞佳山下的伟 微信公众号二维码：



## 2 代码测试软硬件环境

硬件环境：ThinkPad T480 软件环境：Win10

Matlab R2017b

码佳佳山下的帝

## 3 基本绘图命令

### 绘图命令

1.显示 fig 窗口

```
>>figure;
```

2.设置 fig 窗口在屏幕的位置：设置 fig 窗口的背景颜色

```
>>set(gcf,'position',[300,1000,1300,1200],'color','w'); ps:
```

```
gcf=get current figure
```

3.设置坐标轴范围

```
>>axis([0 2*pi -1 1]);
```

4.设置坐标轴的刻度线

```
>>set(gca,'xtick',0:pi/2:2*pi); >>set(gca,'ytick',-1:0.5:1); ps:gca=get current axis
```

5.设置坐标轴的刻度线标签

```
>>set(gca,'xticklabel',{'0','pi' " '2*pi'}); >>set(gca,'yticklabel',{'-1' '-0.5' '0' '0.5' '1'});
```

6.设置坐标轴标签

```
>>xlabel('x');
```

```
>>ylabel('y');
```

7.设置标题

```
>>title('y=sin(x)');
```

8.设置坐标轴边框的粗细程度

```
>>set(gca,'linewidth',2);
```

9.设置坐标轴字体

```
>>set(gca,'fontsize',24,'fontname','Times New Roman','FontWeight','bold');
```

10.设置坐标轴的背景颜色

```
>>set(gca,'color','w');
```

11.添加图例

```
>>legend('sin','location','northwest');
```

12.设置图例格式

```
>>set(leg,'Orientation','horizon');
```

```
>>set(leg,'Box','off');
```

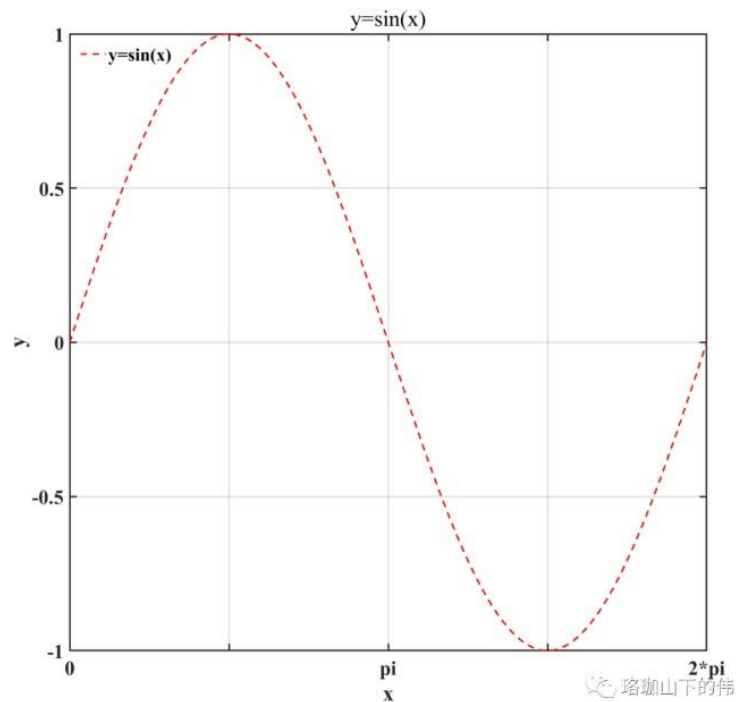
13.添加网格

```
>>grid on;
```

## 实例演示

```
clear;clc;close all;
x=0:0.01:2*pi;
y=sin(x); figure;
set(gcf,'position',[
300,1000,1300,12
00],'color','w');
plot(x,y,'r--
','linewidth',2);
axis([0 2*pi -1
1]);
set(gca,'xtick',0:pi
/2:2*pi);
set(gca,'ytick',-
1:0.5:1);
set(gca,'xticklabel
',{'0','pi'
'2*pi'});
set(gca,'yticklabel
',{'-1' '-0.5' '0'
'0.5' '1'});
xlabel('x');
ylabel('y');
title('y=sin(x)');
set(gca,'linewidth'
,2);
set(gca,'fontsize',
24,'fontname','Ti
mes New
Roman','FontWei
ght','bold');
set(gca,'color','w')
;
leg=legend('y=sin
(x)','location','nort
hwest');
set(leg,'Orientatio
n','horizon');
```

```
set(leg,'Box','off')
; grid on;
```



## 4 绘制子图

### 绘图命令

#### 1. 绘制子图

```
>>subplot(3,1,1); % 3 行 1 列 第 1 个
```

```
>>subplot(3,1,2); % 3 行 1 列 第 2 个
```

```
>>subplot(3,1,3); % 3 行 1 列 第 3 个
```

#### 2. 不覆盖已有内容，在当前坐标轴内继续画图

```
>>hold on;
```

#### 3. 添加文本内容

```
>>text(-0.5,1.1,'(a)','color','r','fontsize',32,'fontname','Times New Roman');
```

```
>>text(-0.5,1.1,'(b)','color','r','fontsize',32,'fontname','Times New Roman');
```

```
>>text(-0.5,1.1,'(c)','color','r','fontsize',32,'fontname','Times New Roman');
```

#### 4. 设置网格格式

```
>>set(gca,'GridLineStyle',':','GridColor',[0.8 0.8 0.8],'GridAlpha',1);
```

#### 5. 设置当前坐标轴在 fig 窗口中的位置

```
>>set(gca,'unit','centimeters','position',[2.7 21.5 30 8.5]);
```

```
>>set(gca,'unit','centimeters','position',[2.7 12 30 8.5]);
```



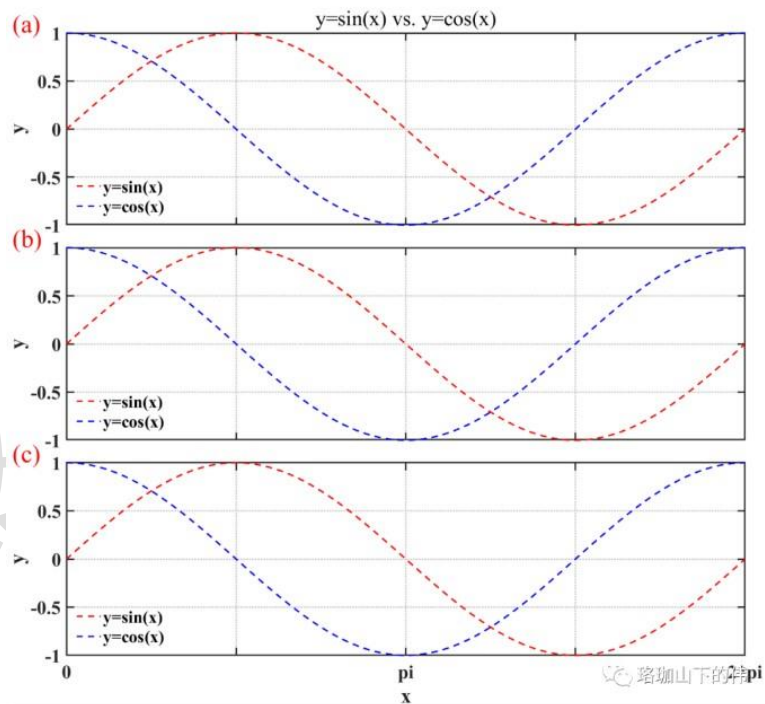
>>set(gca,'unit','centimeters','position',[2.7 2.5 30 8.5]); 实例演示

```
clear;clc;close all; x=0:0.01:2*pi; y_sin=sin(x);
y_cos=cos(x); figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
% subplot1 subplot(3,1,1);
plot(x,y_sin,'r--','linewidth',2); hold
on;
plot(x,y_cos,'b--','linewidth',2); axis([0
2*pi -1 1]); set(gca,'xtick',0:pi/2:2*pi);
set(gca,'ytick',-1:0.5:1);
set(gca,'xticklabel',{});
set(gca,'yticklabel',{'-1' '-0.5' '0' '0.5' '1'}); ylabel('y');
title('y=sin(x) vs. y=cos(x)');
text(-0.5,1.1,'(a)','color','r','fontsize',32,'fontname','Times New Roman');
set(gca,'linewidth',2);
set(gca,'fontsize',24,'fontname','Times New Roman','FontWeight','bold');
set(gca,'color','w');
leg=legend('y=sin(x)','y=cos(x)','location','southwest');
set(leg,'Orientation','vertical'); set(leg,'Box','off'); grid on;
set(gca,'GridLineStyle',':','GridColor',[0.8 0.8 0.8],'GridAlpha',1);
set(gca,'unit','centimeters','position',[2.7 21.5 30 8.5]);
% subplot2 subplot(3,1,2);
plot(x,y_sin,'r--','linewidth',2);
hold on;
plot(x,y_cos,'b--','linewidth',2); axis([0
2*pi -1 1]); set(gca,'xtick',0:pi/2:2*pi);
set(gca,'ytick',-1:0.5:1);
set(gca,'xticklabel',{});
set(gca,'yticklabel',{'-1' '-0.5' '0' '0.5' '1'}); ylabel('y');
text(-0.5,1.1,'(b)','color','r','fontsize',32,'fontname','Times New Roman');
set(gca,'linewidth',2); set(gca,'fontsize',24,'fontname','Times New
Roman','FontWeight','bold'); set(gca,'color','w');
leg=legend('y=sin(x)','y=cos(x)','location','southwest');
set(leg,'Orientation','vertical'); set(leg,'Box','off'); grid on;
set(gca,'GridLineStyle',':','GridColor',[0.8 0.8 0.8],'GridAlpha',1);
set(gca,'unit','centimeters','position',[2.7 12 30 8.5]);
```

```

% subplot3 subplot(3,1,3);
plot(x,y_sin,'r--','linewidth',2);
hold on;
plot(x,y_cos,'b--','linewidth',2); axis([0
2*pi -1 1]); set(gca,'xtick',0:pi/2:2*pi);
set(gca,'ytick',-1:0.5:1);
set(gca,'xticklabel',{'0','pi' '2*pi'});
set(gca,'yticklabel',{'-1' '-0.5' '0' '0.5' '1'});
xlabel('x'); ylabel('y');
text(-0.5,1.1,'(c)','color','r','fontsize',32,'fontname','Times New Roman');
set(gca,'linewidth',2);
set(gca,'fontsize',24,'fontname','Times New Roman','FontWeight','bold');
set(gca,'color','w');
leg=legend('y=sin(x)','y=cos(x)','location','southwest');
set(leg,'Orientation','vertical'); set(leg,'Box','off'); grid on;
set(gca,'GridLineStyle',':','GridColor',[0.8 0.8 0.8],'GridAlpha',1);
set(gca,'unit','centimeters','position',[2.7 2.5 30 8.5]);

```



# 5 绘图属性常用选项汇总

## 绘图属性常用选项汇总

1.fontname % 字体类型宋体、黑体、楷体、简雅黑、Times

New Roman、Arial

2.location % 图例位置

属性选项	注释	属性选项	注释
1	右上角	2	左上角
3	左下角	4	右下角
northeast	右上角	northwest	左上角
southwest	左下角	southeast	右下角

3.color % 颜色

属性选项	注释	属性选项	注释
k	黑色	w	白色
r	红色	c	青色
g	绿色	m	紫色
b	蓝色	[0.8 0.8 0.8]	灰色
y	黄色	[1.0 0.5 0.0]	橘黄色/橙色

4.线型

属性选项	注释	属性选项	注释
-	实线	-.	点划线
--	长虚线	:	短虚线

5.特殊符号

属性选项	注释	属性选项	注释
_	下标	^	上标
\it	斜体	\bf	黑体
\pm	±	\circ	上圆圈 (度数)

6.希腊字母

属性选项	注释	属性选项	注释
\alpha	$\alpha$	\beta	$\beta$
\gamma	$\gamma$	\theta	$\theta$
\Theta	$\Theta$	\delta	$\delta$
\Delta	$\Delta$	\sigma	$\sigma$

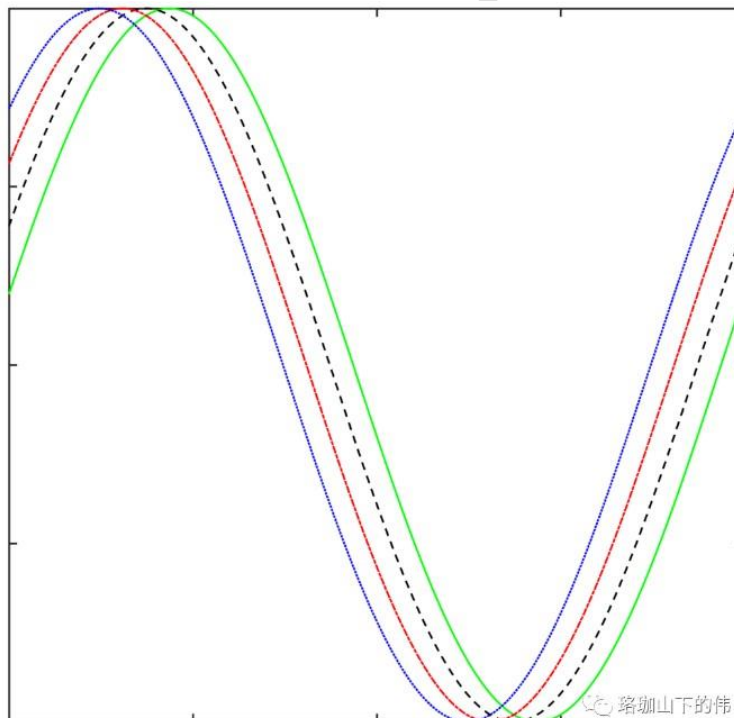
## 实例演示 01

```
clear;clc;close all; x=0:0.01:2*pi;
y=sin(x)+100; figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
plot(x,y,'r--','linewidth',2); axis([0 2*pi -1 1]);
set(gca,'xtick',0:pi/2:2*pi); set(gca,'ytick',-1:0.5:1);
set(gca,'xticklabel',{}); set(gca,'yticklabel',{});
text(0.5,0.8,'珞珈山下的伟','color','k','fontsize',32,'fontname','宋体');
text(0.5,0.6,'珞珈山下的伟','color','r','fontsize',32,'fontname','黑体');
text(0.5,0.4,'珞珈山下的伟','color','y','fontsize',32,'fontname','楷体');
text(0.5,0.2,'珞珈山下的伟','color','w','fontsize',32,'fontname','简雅黑');
text(0.5,0.0,'RTHRgnss-seisman','color','c','fontsize',32,'fontname','Times New Roman');
text(0.5,-0.2,'RTHRgnss-seisman','color','m','fontsize',32,'fontname','Arial'); text(0.5,-
0.4,'RTHRgnss-seisman','color',[1.0 0.5 0.0],'fontsize',32,'fontname','Arial');
set(gca,'linewidth',2); set(gca,'color',[0.8 0.8 0.8]); set(gca,'fontsize',24,'fontname','Times
New Roman','FontWeight','bold');
```



## 实例演示 02

```
clear;clc;close all;
x=0:0.01:2*pi;
y_1=sin(x+0.2);
y_2=sin(x+0.4);
y_3=sin(x+0.6);
y_4=sin(x+0.8); figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
plot(x,y_1,'g-', 'linewidth',2); hold on;
plot(x,y_2,'k--','linewidth',2); hold
on;
plot(x,y_3,'r-.','linewidth',2); hold
on;
plot(x,y_4,'b:', 'linewidth',2); axis([0 2*pi -1 1]);
set(gca,'xtick',0:pi/2:2*pi); set(gca,'ytick',-1:0.5:1);
set(gca,'xticklabel',{}); set(gca,'yticklabel',{}); set(gca,'linewidth',2);
set(gca,'fontsize',24,'fontname','Times New Roman','FontWeight','bold');
set(gca,'color','w');
```



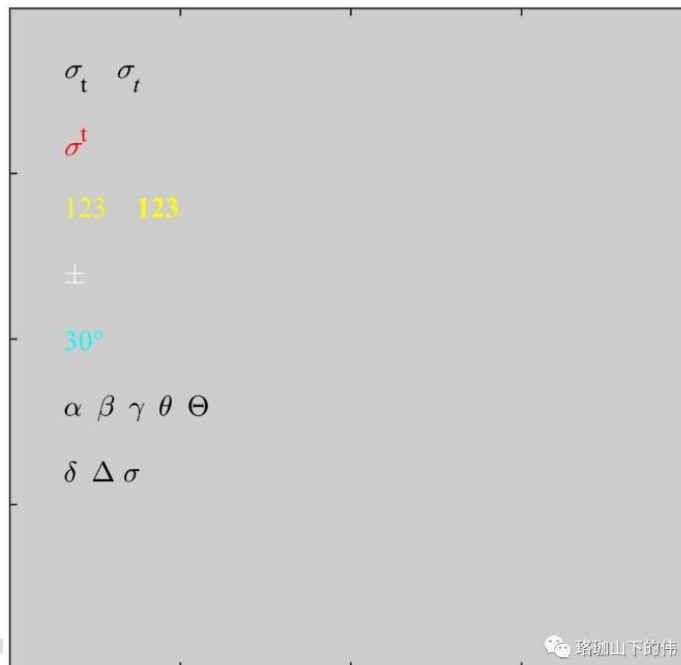
## 实例演示 03

```
clear;clc;close all;
x=0:0.01:2*pi;
y=sin(x)+100; figure;
```

```

set(gcf,'position',[300,1000,1300,1200],'color','w'); plot(x,y,'r--','linewidth',2); axis([0 2*pi
-1 1]); set(gca,'xtick',0:pi/2:2*pi); set(gca,'ytick',-1:0.5:1); set(gca,'xticklabel',{});
set(gca,'yticklabel',{}); text(0.5,0.8,'\it\sigma}_t
{\it\sigma}_t','color','k','fontsize',32,'fontname','Times New Roman');
text(0.5,0.6,'\it\sigma}^t','color','r','fontsize',32,'fontname','Times New Roman'); text(0.5,0.4,'123
{\bf123}','color','y','fontsize',32,'fontname','Times New Roman');
text(0.5,0.2,'\pm','color','w','fontsize',32,'fontname','Times New Roman');
text(0.5,0.0,'30\circ','color','c','fontsize',32,'fontname','Times New Roman');
text(0.5,-0.2,'\alpha \beta \gamma \theta \Theta','color','k','fontsize',32,'fontname','Times New
Roman');
text(0.5,-0.4,'\delta \Delta \sigma','color','k','fontsize',32,'fontname','Times New Roman'); set(gca,'linewidth',2);
set(gca,'fontsize',24,'fontname','Times New Roman','FontWeight','bold');
set(gca,'color',[0.8 0.8 0.8]);

```



## 6 双轴图

```

clear;clc;close all;fclose all;
x=0:0.01:2*pi;
y_sin_1=sin(x);
y_sin_2=sin(x+pi/4);
y_cos_1=cos(x);
y_cos_2=cos(x+pi/4); figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
[AX,L1,L2]=plotyy(x,[y_sin_1;y_sin_2],x,[y_cos_1;y_cos_2]);

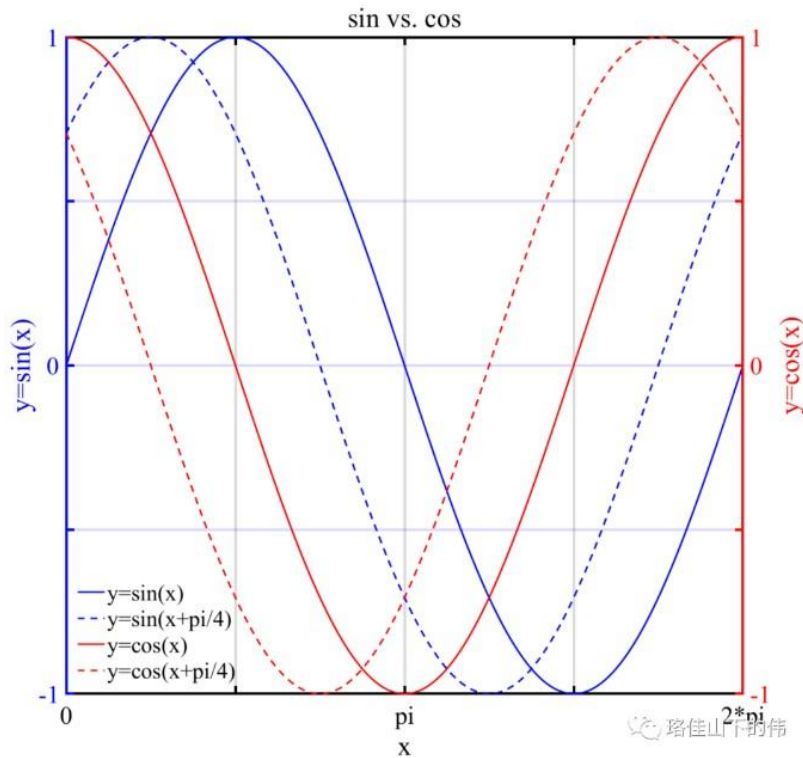
```

```

set(L1(1),'LineStyle','-','linewidth',2,'color','b'); set(L1(2),'LineStyle','--
','linewidth',2,'color','b'); set(L2(1),'LineStyle','-','linewidth',2,'color','r');
set(L2(2),'LineStyle','--','linewidth',2,'color','r');
% X1
set(AX(1),'xcolor','k','linewidth',3); set(AX(1),'xlim',[0
2*pi],'xtick',0:pi/2:2*pi);
set(AX(1),'xticklabel',{'0' " 'pi' " '2*pi'}); XL1=get(AX(1),'xlabel');
set(XL1,'string','x','color','k','fontsize',28,'fontname','Times New Roman');
% Y1
set(AX(1),'ycolor','b','linewidth',3);
set(AX(1),'ylim',[-1 1]); set(AX(1),'ytick',-1:0.5:1);
set(AX(1),'yticklabel',{'-1' " '0' " '1'});
YL1=get(AX(1),'ylabel'); set(YL1,'string','y=sin(x)','color','b','fontsize',28,'fontname','Times
New Roman');
% X2
set(AX(2),'xcolor','k','linewidth',3); set(AX(2),'xlim',[0
2*pi],'xtick',0:pi/2:2*pi);
set(AX(2),'xticklabel',{'0' " 'pi' " '2*pi'}); XL2=get(AX(2),'xlabel');
set(XL2,'string','x','color','k','fontsize',28,'fontname','Times New Roman');
% Y2
set(AX(2),'ycolor','r','linewidth',3);
set(AX(2),'ylim',[-1 1]); set(AX(2),'ytick',-1:0.5:1);
set(AX(2),'yticklabel',{'-1' " '0' " '1'});
YL2=get(AX(2),'ylabel');
set(YL2,'string','y=cos(x)','color','r','fontsize',28,'fontname','Times New Roman');

set(AX(1),'fontsize',28,'fontname','Times New Roman');
set(AX(2),'fontsize',28,'fontname','Times New Roman');
leg=legend([L1(1),L1(2),L2(1),L2(2)], {'y=sin(x)' 'y=sin(x+pi/4)' 'y=cos(x)' 'y=cos(x+pi/4)'});
set(leg,'location','southwest','Box','off');
title('sin vs. cos'); grid
on;

```



## 7 柱状图

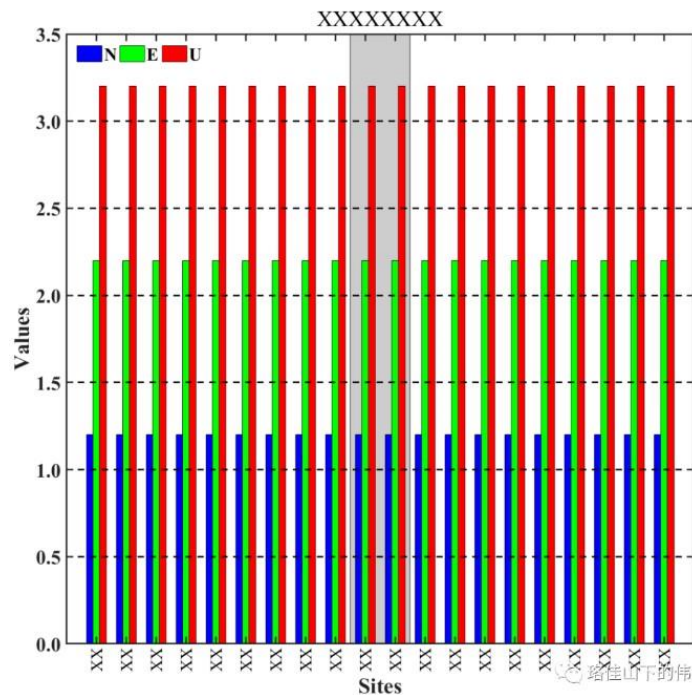
```

clear;clc;close all;fclose
all; %% prepare data
num=20; sitesName=cell(num,1); for
i=1:num sitesName{i,1}='XX'; end
NEU=[repelem(1.2,num)' repelem(2.2,num)' repelem(3.2,num)'];
%% figure figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
% shadow
fill([9.5 11.5 11.5 9.5],[0 0 3.5 3.5],[0.8 0.8 0.8]); hold on; %
bar
L=bar(1:num,NEU,1); L(1).FaceColor='b'; L(2).FaceColor='g'; L(3).FaceColor='r'; axis([0
21 0 3.5]); set(gca,'xtick',0:1:21); set(gca,'xticklabel',{' '});
set(gca,'ytick',0:0.5:4); set(gca,'yticklabel',{'0.0' '0.5' '1.0' '1.5' '2.0' '2.5' '3.0' '3.5'}); xlabel('Sites');
ylabel('Values'); title('XXXXXXXXX'); text(1:20,repelem(-
0.02,num),sitesName,'HorizontalAlignment','right','rotation',90,...
'fontsize',20,'fontname','Times New Roman'); set(gca,'linewidth',2);
set(gca,'yGrid','on'); set(gca,'GridLineStyle','--','GridColor','k','GridAlpha',1);
set(gca,'layer','top'); set(gca,'fontsize',24,'fontname','Times New
Roman','FontWeight','bold'); set(gca,'color','w');

```



```
leg=legend(L,'N','E','U','location','northwest');
set(leg,'Orientation','horizon'); set(leg,'Box','off');
```



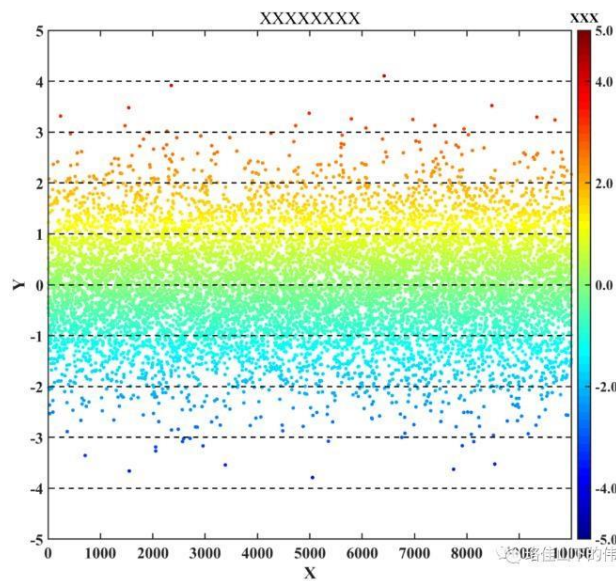
## 8 散点图

```
clear;clc;close all;fclose
all; %% prepare data
x=1:10000; y=randn(1,10000);
%% figure figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
scatter(x,y,30,y,'o','filled');
colormap(jet); % jet hot axis([0
10000 -5 5]);
set(gca,'xtick',0:1000:10000);
set(gca,'xticklabel',{'0' '1000' '2000' '3000' '4000' '5000' '6000' '7000' '8000' '9000' '10000'});
set(gca,'ytick',-5:1:5); set(gca,'yticklabel',{'-5' '-4' '-3' '-2' '-1' '0' '1' '2' '3' '4' '5'}); xlabel('X');
ylabel('Y'); title('XXXXXXXXXX'); set(gca,'linewidth',2); set(gca,'yGrid','on');
set(gca,'GridLineStyle','--','GridColor','k','GridAlpha',1); set(gca,'layer','top');
set(gca,'fontsize',24,'fontname','Times New Roman','FontWeight','bold'); set(gca,'color','w');
box on;
set(gca,'unit','centimeters','position',[2.7 2.5 27.8 27]);
% colorbar cb=colorbar('verti'); % horiz verti
pos=get(cb,'pos'); % get current(default) position of the colorbar
set(cb,'pos',pos+[0.05 0 0 0]); caxis([-5 5]); set(cb,'linewidth',2);
```

```

set(cb,'ticks',[-5 -4 -2 0 2 4 5]); set(cb,'xticklabel',{'-5.0' '-4.0' '-2.0' '0.0' '2.0' '4.0' '5.0'});
set(get(cb,'xlabel'),'string','Y','color','k','fontsize',20,'fontname','Times New Roman');
set(get(cb,'title'),'string','XXX','color','k','fontsize',20,'fontname','Times New Roman');

```



## 9 天空图

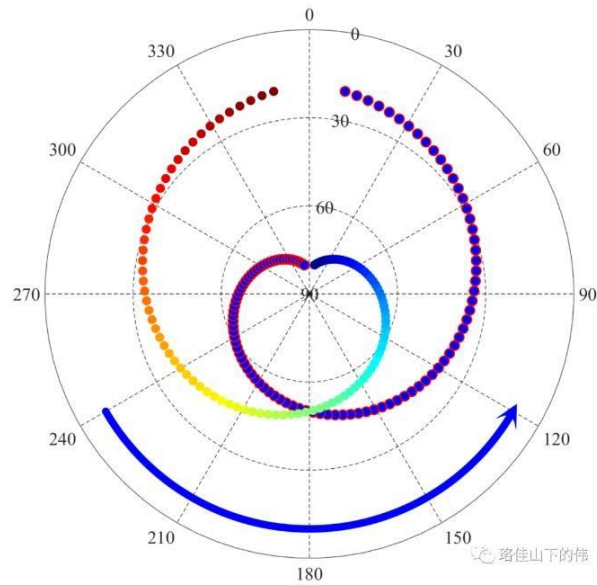
```

clc;clear;close all;fclose
all; %% prepare data
ele_1=linspace(20,80,100); % in degree
azi_1=linspace(10,350,100); % in degree
ele_2=linspace(20,80,100); azi_2=linspace(350,10,100);
ele_3=linspace(10,10,1000); azi_3=linspace(240,120,1000);
%% figure figure; set(gcf,'position',[300,1000,1300,1200],'color','w'); deg2rad=pi/180; % one
polarplot(azi_1*deg2rad,90-ele_1,'ro','linewidth',2,'markersize',15,'markerfacecolor','b'); hold on;
% two
polarscatter(azi_2*deg2rad,90-ele_2,200,90-ele_2,'o','filled');
colormap(jet); hold on;
% three
polarplot(azi_3*deg2rad,90-ele_3,'b.','markersize',40);
arr=annotation('arrow',[0.82 0.83],[0.29 0.31]); set(arr,'linestyle','-','color','b','linewidth',4);
set(arr,'headstyle','cback3','headsiz',35); % plain cback3

set(gca,'ThetaDir','clockwise','ThetaZeroLocation','top');
set(gca,'RLim',[0 90],'RTick',[0 30 60 90],'RTickLabel',{'90' '60' '30' '0'});
set(gca,'GridColor','k','LineWidth',1,'GridAlpha',0.9);
set(gca,'GridLineStyle','--');

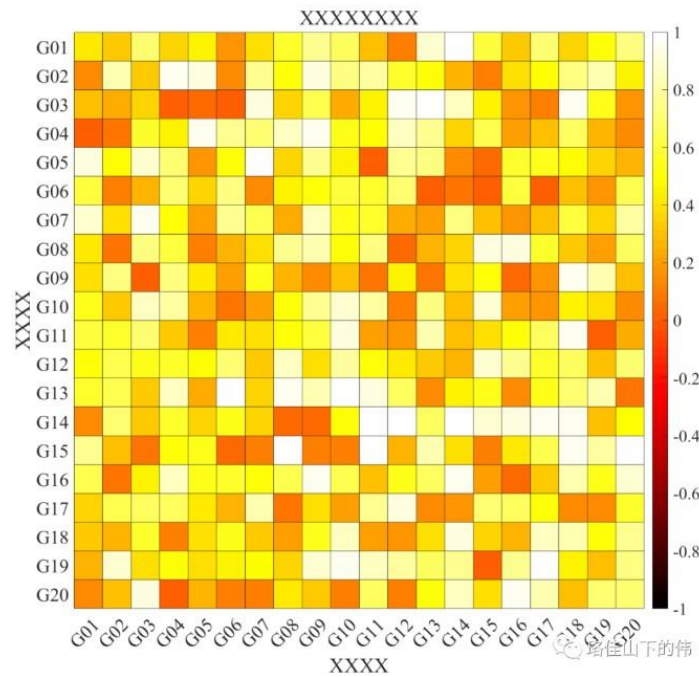
```

```
set(gca,'fontsize',28,'fontname','Times New Roman');
set(gca,'looseInset',[0 0 0 0]);
```



## 10 热力图

```
clc;clear;close all;fclose
all; %% prepare data
a=rand(20,20);
xname=cell(1,20);
yname=cell(1,20); for
i=1:20
    xname{1,i}=['G' num2str(i,'%02d')];
yname{1,i}=['G' num2str(i,'%02d')]; end %% figure
figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
hm=heatmap(xname,yname,a,'colormap',colormap('hot'));
caxis([-1 1]);
%hm.CellLabelFormat = '%0.2f';
hm.CellLabelColor = 'none';
xlabel('XXXXX'); ylabel('XXXXX');
title('XXXXXXXXXX');
set(gca,'fontsize',24,'fontname','Times New Roman');
```



## 11 对数坐标、图中图

```

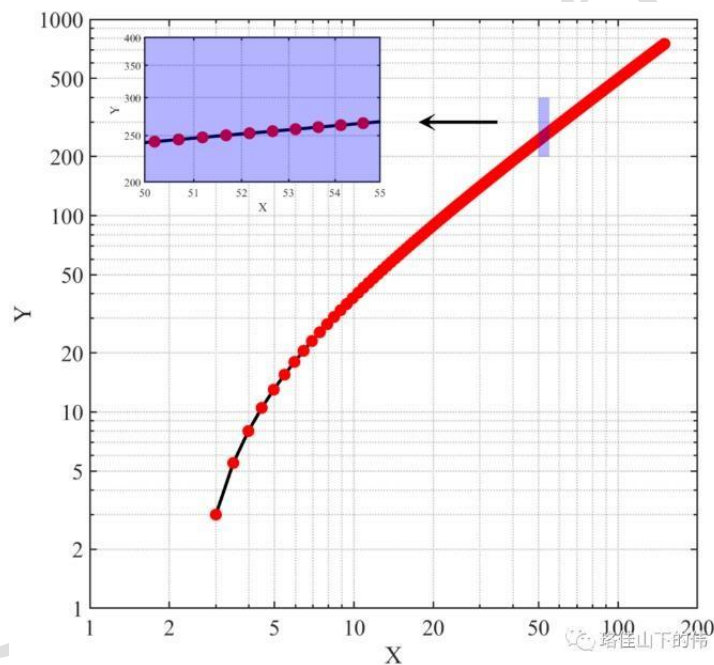
clc;clear;close all;fclose all;
%% prepare data X=linspace(3,150,300);
Y=linspace(3,750,300);
%% figure figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
% 对数坐标
ax1=loglog(X,Y,'-ok','linewidth',4,...
    'markersize',15,'markerfacecolor','r','markeredgecolor','none');
hold on; % shadow
fil=fill([50 50 55 55],[200 400 400 200],'b');
set(fil,'edgealpha',0,'facealpha',0.3);
% arrow
arr=annotation('arrow',[0.65 0.55],[0.783 0.783]);
set(arr,'linestyle','-','color','k','linewidth',4);
set(arr,'headstyle','cback3','headsiz',20); % plain cback3 axis([1
200 1 1000]); set(gca,'xtick',[1 2 5 10 20 50 100 200]);
set(gca,'xticklabel',{'1' '2' '5' '10' '20' '50' '100' '200'});
set(gca,'ytick',[1 2 5 10 20 50 100 200 500 1000]);
set(gca,'yticklabel',{'1' '2' '5' '10' '20' '50' '100' '200' '500' '1000'});
xlabel('X'); ylabel('Y'); set(gca,'linewidth',2);
set(gca,'fontsize',28,'fontname','Times New Roman'); grid on;

```

```

set(gca,'GridLineStyle',':','GridColor',[0.8 0.8 0.8],'GridAlpha',1);
% 图中图
ax2=axes('position',[0.2 0.7 0.3 0.2]); loglog(ax2,X,Y,'-ok','linewidth',4,...
    'markersize',15,'markerfacecolor','r','markeredgecolor','none');
hold on; % shadow
fil=fill([50 50 55 55],[200 400 400 200],'b');
set(fil,'edgealpha',0,'facealpha',0.3); axis([50
55 200 400]); set(gca,'xtick',50:55);
set(gca,'xticklabel',{'50' '51' '52' '53' '54' '55'});
set(gca,'ytick',200:50:400); set(gca,'yticklabel',{'200' '250' '300' '350'
'400'}); xlabel('X'); ylabel('Y'); set(gca,'linewidth',2);
set(gca,'fontsize',14,'fontname','Times New Roman'); grid on;
set(gca,'GridLineStyle',':','GridColor',[0.8 0.8 0.8],'GridAlpha',1);

```



## 12 等高线图

```

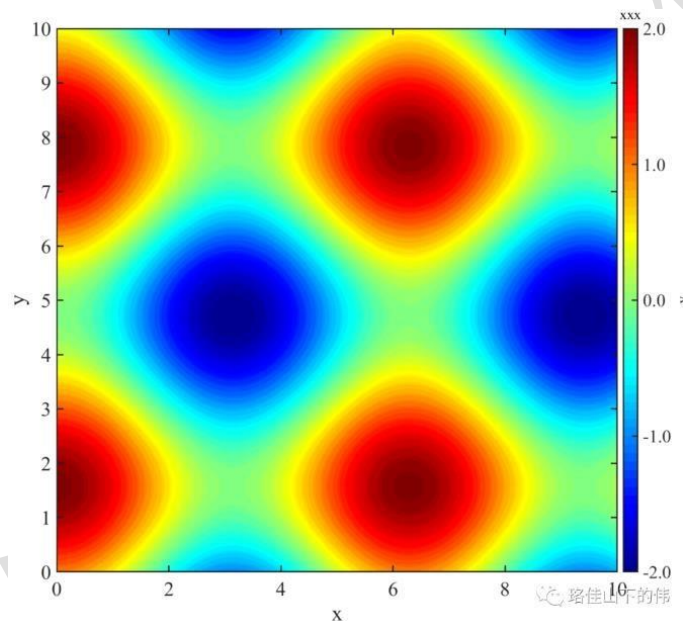
clc;clear;close all;fclose all;
%% prepare data x=linspace(0,10,100);
y=linspace(0,10,100);
[X,Y]=meshgrid(x,y);
Z=cos(X)+sin(Y);
%% figure figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
[~,ctf]=contourf(X,Y,Z,100,'--','linewidth',2);

```

```

colormap(jet); set(ctf,'LineColor','none'); xlabel('x');
ylabel('y'); set(gca,'linewidth',2);
set(gca,'fontsize',28,'fontname','Times New Roman');
set(gca,'unit','centimeters','position',[2.7 3 27.8 27]);
% colorbar
cb=colorbar('verti'); % horiz verti
pos=get(cb,'pos'); % get current(default) position of the colorbar
set(cb,'pos',pos+[0.05 0 0 0]); caxis([-2, 2]);
set(cb,'linewidth',2); set(cb,'ticks',[-2 -1 0 1 2]);
set(cb,'xticklabel',{'-2.0' '-1.0' '0.0' '1.0' '2.0'});
set(get(cb,'xlabel'),'string','y','color','k','fontsize',20,'fontname','Times New Roman');
set(get(cb,'title'),'string','xxx','color','k','fontsize',20,'fontname','Times New Roman');

```



## 13 自动生成可区分的颜色、多图例

```

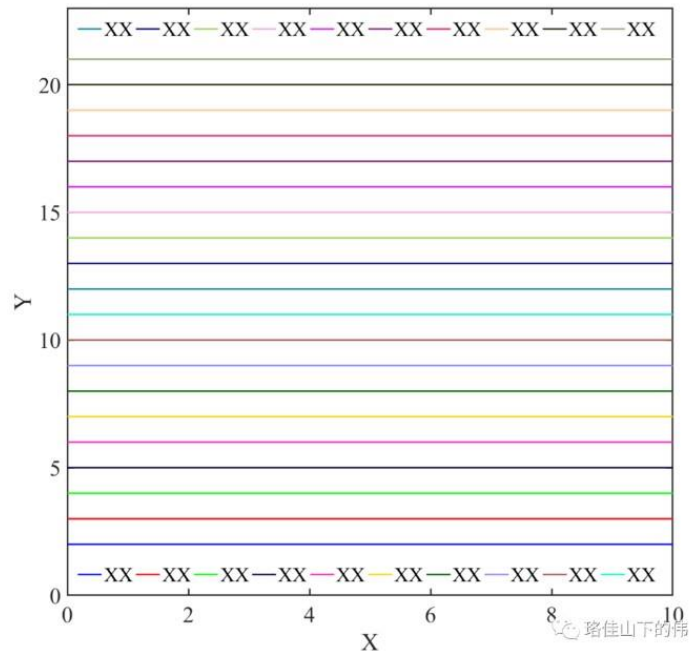
clc;clear;close all;fclose all;
%% prepare data x=[0 10]; y=1:20; %%
figure
colors=distinguishable_colors(20,{'w'});
figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
L=cell(20,1); for i=1:20
    L{i,1}=plot(x,[y(i) y(i)]+1,'color',colors(i,:), 'linewidth',2);
hold on; end
axis([0 10 0 23]); xlabel('X');
ylabel('Y');

```

```

set(gca,'linewidth',2); set(gca,'fontsize',28,'fontname','Times New Roman');
leg1=legend([L{1:10,1}], 'XX','XX','XX','XX','XX','XX','XX','XX','XX','XX'); set(leg1,'location','southwest');
set(leg1,'Orientation','horizontal'); % horizontal vertical
set(leg1,'Box','off'); ax2=axes('position',get(gca,'position'),'visible','off');
leg2=legend(ax2,[L{11:20,1}], 'XX','XX','XX','XX','XX','XX','XX','XX','XX','XX'); set(leg2,'location','northwest');
set(leg2,'Orientation','horizontal'); % horizontal vertical
set(leg2,'Box','off');
set(gca,'fontsize',28,'fontname','Times New Roman');

```



## 14 动图 gif

```

clc;clear;close all;fclose all;
%% prepare pictures for making gif
[m_path,~,~]=fileparts(mfilename('fullpath'));
mkdir([m_path '\pics']); num=300;
x=linspace(0,40,num); y=sin(x); for i=1:num figure;
set(gcf,'position',[300,1000,1300,1200],'color','w');
plot(x,y,'b','linewidth',2); hold on;
plot(x(i),y(i),'r','markersize',60); set(gca,'linewidth',2);
set(gca,'xtick',[]); set(gca,'ytick',[]);
set(gca,'looseInset',[0 0 0 0]); axis([-inf inf -1.1 1.1]);
saveas(gcf,[m_path '\pics\' num2str(i,'%03d') '.jpg']);
close; end
%% making gif

```

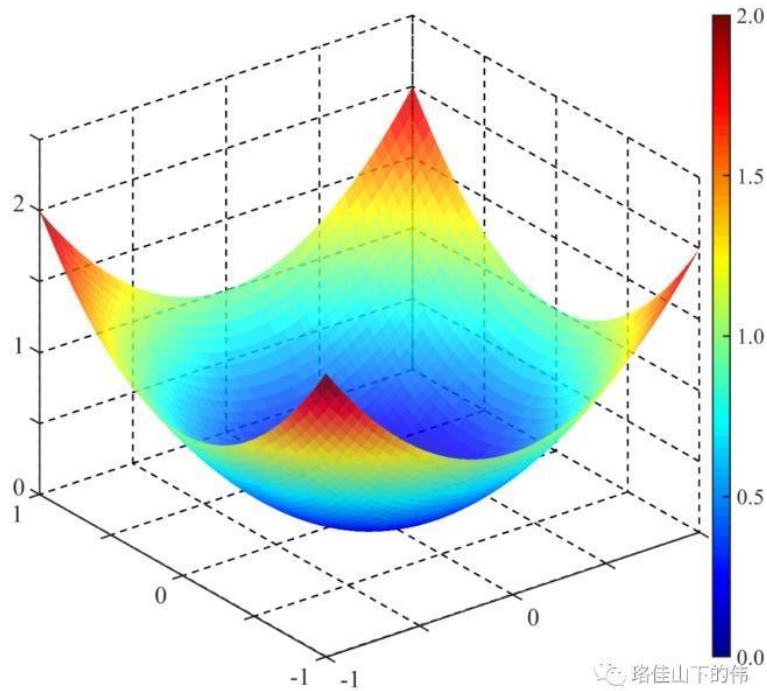
```
[picsName,picsNum]=getALLFileName('.',\pics\','*.jpg');
cd([m_path \pics']); makegif(picsName,'SIN');
cd(m_path);
```

在[珞佳山下的伟](#)公众号中回复“MC001”即可获得 distinguishable\_colors 源码在[珞佳山下的伟](#)公众号中回复“MC002”即可获得 makegif 源码  
在[珞佳山下的伟](#)公众号中回复“MC003”即可获得 getALLFileName 源码  
在[珞佳山下的伟](#)公众号中回复“008MG”即可获得 SIN.gif 动图

## 15 三维曲面

```
clc;clear;close all;fclose all;
%% prepare data x=linspace(-1,1,50);
y=linspace(-1,1,50);
[xx,yy]=meshgrid(x,y); zz=xx.^2+yy.^2;
%% figure figure; set(gcf,'position',[300,1000,1300,1200],'color','w');
surf(xx,yy,zz,'facealpha',0.8,'edgecolor','none'); colormap(jet); % cool
hot jet xlabel("");ylabel("");zlabel("");title(""); xlim([-1 1]);ylim([-1
1]);zlim([0 2.5]); set(gca,'xtick',-1:0.5:1,'xticklabel',{'-1' '0' '1'});
set(gca,'ytick',-1:0.5:1,'yticklabel',{'-1' '0' '1'});
set(gca,'ztick',0:0.5:2.5,'zticklabel',{'0' '1' '2'});
% legend('XXX');
set(gca,'GridLineStyle','--','GridColor','k','GridAlpha',1);
set(gca,'linewidth',2); set(gca,'fontsize',28,'fontname','Times New Roman');
% colorbar
colorbar; cb=colorbar('verti'); % horiz verti
pos=get(cb,'pos'); % get current(default) position of the colorbar
set(cb,'pos',pos+[0.05 0 0 0]);
caxis([0 2]); set(cb,'linewidth',2); set(cb,'ticks',0:0.5:2);
set(cb,'xticklabel',{'0.0' '0.5' '1.0' '1.5' '2.0'});
set(get(cb,'xlabel'),'string','','color','k','fontsize',20,'fontname','Times New Roman');
set(get(cb,'title'),'string','','color','k','fontsize',20,'fontname','Times New Roman');
```



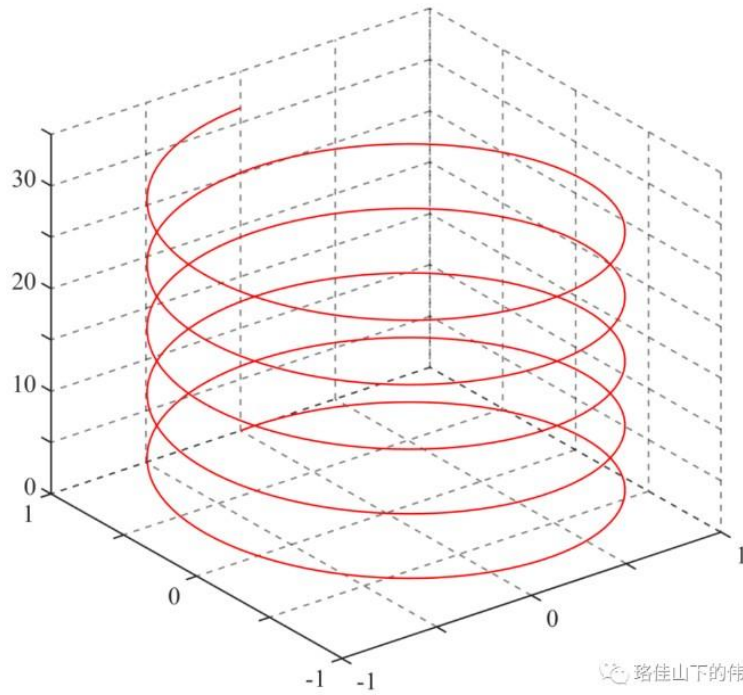


## 16 三维曲线

```

clc;clear;close all;fclose
all; %% prepare data
t=0:pi/50:10*pi; st=sin(t);
ct=cos(t); %% figure
figure; set(gcf,'position',[300,1000,1300,1200],'color','w');
plot3(st,ct,t,'linewidth',2);
xlabel("");ylabel("");zlabel("");title(""); xlim([-1
1]);ylim([-1 1]);zlim([0 35]); set(gca,'xtick',-
1:0.5:1,'xticklabel',{'-1' " '0' " '1'});
set(gca,'ytick',-1:0.5:1,'yticklabel',{'-1' " '0' " '1'});
set(gca,'ztick',0:5:35,'zticklabel',{'0' " '10' " '20' " '30' });
%
legend(""); %
box on; grid
on;
set(gca,'GridLineStyle','--','GridColor','k','GridAlpha',0.5);
set(gca,'linewidth',2);
set(gca,'fontSize',28,'fontName','Times New Roman');

```



## 17 直方图

```

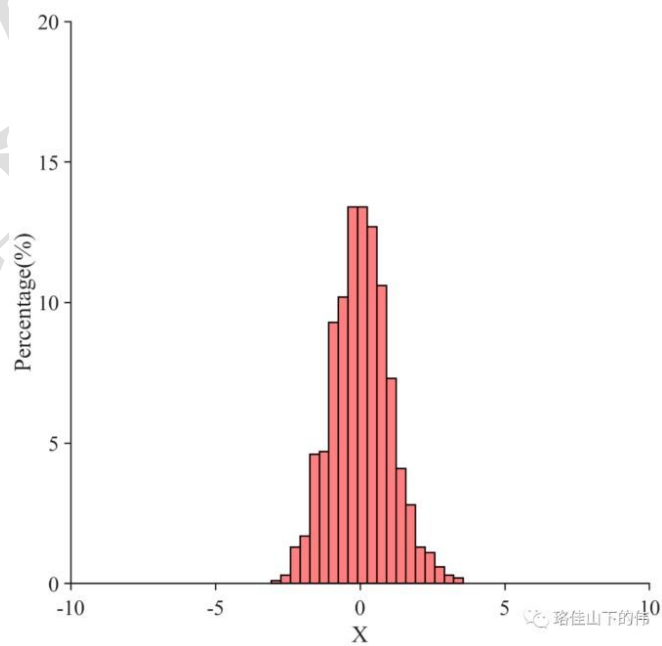
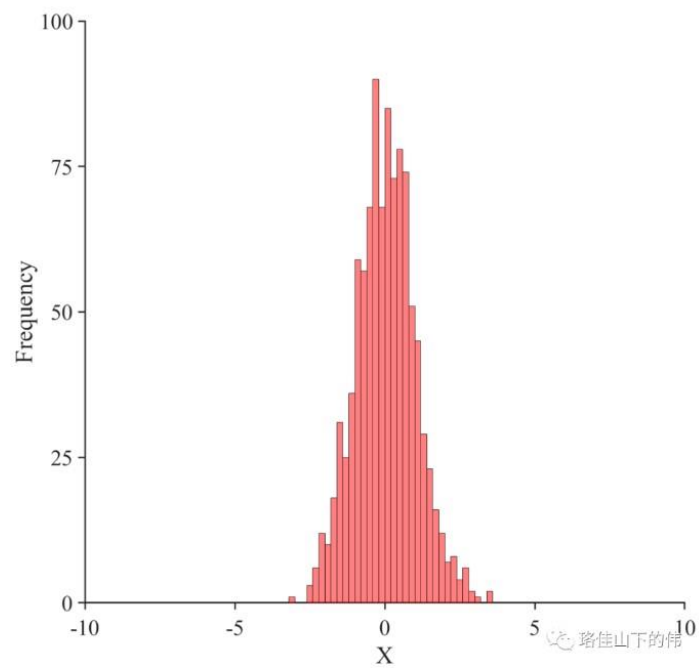
clc;clear;close all;fclose
all; %% prepare data
x=randn(1000,1); %%
figure % histogram figure;
set(gcf,'position',[300,1000,1300,1200],'color','w'); hold
on;
histogram(x,-10:0.2:10,'facecolor','r','facealpha',0.5,'edgecolor','k');
axis([-10 10 0 100]); xlabel('X'); ylabel('Frequency');
set(gca,'xtick',-10:5:10,'xticklabel',{'-10' '-5' '0' '5' '10'});
set(gca,'ytick',0:25:100,'yticklabel',{'0' '25' '50' '75' '100'});
set(gca,'tickdir','out');
set(gca,'GridLineStyle','--','GridColor','k','GridAlpha',1);
set(gca,'linewidth',2); set(gca,'fontsize',28,'fontname','Times
New Roman');
% hist figure;
set(gcf,'position',[300,1000,1300,1200],'color','w'); hold
on;
[number,x_out]=hist(x,20);
bar(x_out,number/sum(number)*100,1,'facecolor','r','facealpha',0.5,...

```

```

'edgecolor','k','linewidth',2,'linestyle','-');
axis([-10 10 0 20]); xlabel('X');
ylabel('Percentage(%)');
set(gca,'xtick',-10:5:10,'xticklabel',{'-10' '-5' '0' '5' '10'});
set(gca,'ytick',0:5:20,'yticklabel',{'0' '5' '10' '15' '20'});
set(gca,'tickdir','out');
set(gca,'GridLineStyle','--','GridColor','k','GridAlpha',1);
set(gca,'linewidth',2);
set(gca,'fontsize',28,'fontname','Times New Roman');

```

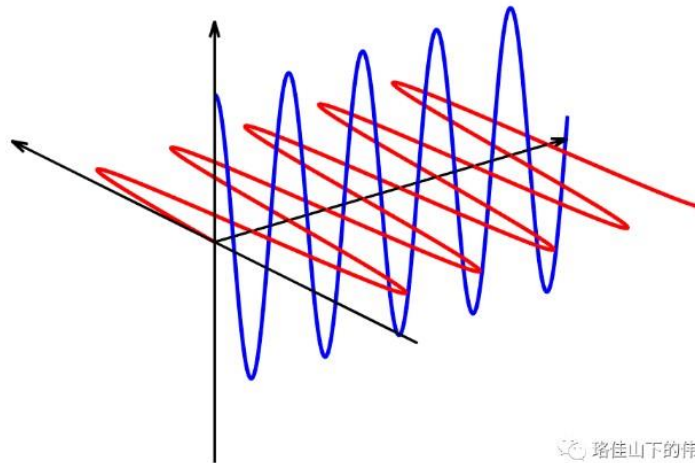
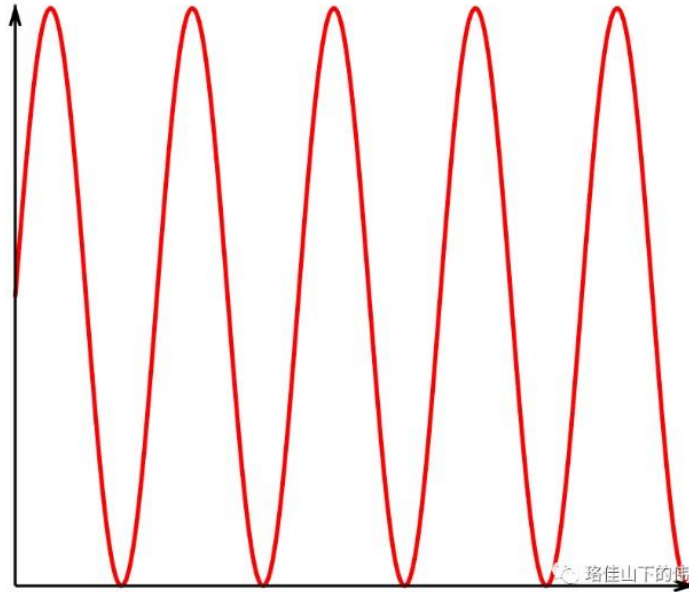


## 18 直线箭头

% arrow.m: 绘制任意两点间的直线箭头, 可应用于二维或三维图形

% 多用此函数绘制带箭头的坐标轴

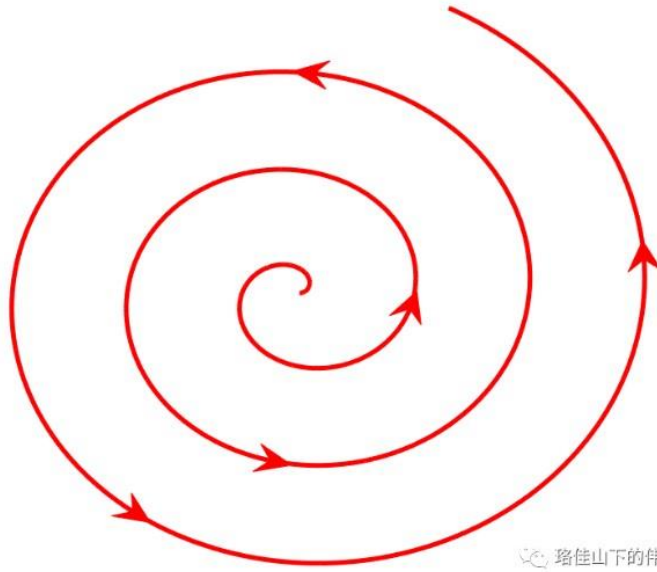
```
clc;clear;close all;fclose
all; %% prepare data
x=linspace(0,30,1000);
y1=2*sin(x); z1=0*cos(x);
y2=0*sin(x); z2=2*cos(x);
%% figure
% 二维
figure;
set(gcf,'position',[300,100,800,650],'color','w');
plot(x,y1,'r-','LineWidth',3); axis([0 30 -2 2]);
arrow([0 -2],[30 -2],'BaseAngle',20,'LineWidth',2);
arrow([0 -2],[0 2],'BaseAngle',20,'LineWidth',2);
axis off;
% 三维
figure;
set(gcf,'position',[300,100,800,650],'color','w');
plot3(x,y1,z1,'r-','LineWidth',3); hold on;
plot3(x,y2,z2,'b-','LineWidth',3); set(gca,'XLim',[0
30]); set(gca,'YLim',[-2 2]); set(gca,'ZLim',[-2 2]);
set(gca,'xtick',0:5:30,'xticklabel',{'0' '10' '20' '30'});
set(gca,'ytick',-2:1:2,'yticklabel',{'-2' '0' '2'});
set(gca,'ztick',-2:1:2,'zticklabel',{'-2' '0' '2'});
xlabel(""); ylabel(""); zlabel("");
arrow([0 0 0],[30 0 0],'BaseAngle',20,'LineWidth',2);
arrow([0 -3 0],[0 3 0],'BaseAngle',20,'LineWidth',2);
arrow([0 0 -3],[0 0 3],'BaseAngle',20,'LineWidth',2);
grid on; axis off;
set(gca,'GridLineStyle','--','GridColor','k','GridAlpha',0.5);
set(gca,'linewidth',1); set(gca,'fontsize',20,'fontname','Times
New Roman');
```



在[珞佳山下的伟](#)公众号中回复“MC004”即可获得 arrow 源码

## 19 曲线箭头

```
% arrowPlot.m: 绘制任意曲线的趋势非线型箭头，只能应用于二维图形
clc;clear;close all;fclose all; %% prepare data t=0:0.01:20; x=t.*cos(t);
y=t.*sin(t);
%% figure figure;
set(gcf,'position',[300,100,800,650],'color','w');
arrowPlot(x,y,'number',5,'color','r','LineWidth',3,'scale',2); axis
off;
```



在[骆佳山下的伟](#)公众号中回复“MC005”即可获得 arrowPlot 源码

## 20 误差棒

```

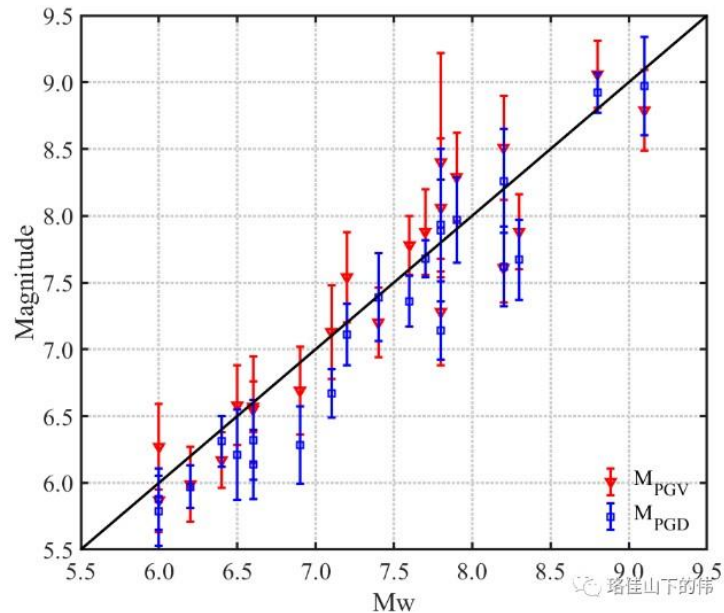
clc;clear;close all;fclose all;
%% prepare data
Mw=[6.00 6.00 6.20 6.40 6.50 6.60 6.60 6.90 7.10 7.20 7.40 7.60 7.70 7.80 7.80 7.80 7.90 8.20 8.20
8.30 8.80 9.10];
Mv=[6.27 5.87 5.99 6.17 6.58 6.55 6.57 6.69 7.13 7.54 7.20 7.78 7.88 8.06 8.40 7.28 8.29 7.61 8.51
7.88 9.06 8.79];
STDv=[0.32 0.24 0.28 0.21 0.30 0.40 0.19 0.33 0.35 0.34 0.26 0.22 0.32 0.52 0.82 0.40 0.33 0.26 0.39
0.28 0.25 0.30];
Md=[5.79 5.88 5.97 6.31 6.21 6.32 6.14 6.28 6.67 7.11 7.39 7.36 7.68 7.89 7.93 7.14 7.97 7.62 8.26
7.67 8.92 8.97];
STDd=[0.26 0.23 0.16 0.19 0.34 0.30 0.26 0.29 0.18 0.23 0.33 0.19 0.14 0.38 0.57 0.22 0.32 0.30
0.39 0.30 0.15
0.37]; %% figure
figure;
set(gcf,'position',[300,100,800,650],'color','w');
errorbar(Mw,Mv,STDv,'rv','linewidth',2); hold on;
errorbar(Mw,Md,STDd,'bs','linewidth',2); hold on; plot([5
10],[5 10],'k','linewidth',2); axis([5.5 9.5 5.5 9.5]);
set(gca,'xtick',[5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10]);

```

```

set(gca,'xticklabel',{'5.0' '5.5' '6.0' '6.5' '7.0' '7.5' '8.0' '8.5' '9.0' '9.5' '10.0'}); set(gca,'ytick',[5
5.5 6 6.5 7 7.5 8 8.5 9 9.5 10]);
set(gca,'yticklabel',{'5.0' '5.5' '6.0' '6.5' '7.0' '7.5' '8.0' '8.5' '9.0' '9.5' '10.0'});
set(gca,'linewidth',2); leg=legend('M_{PGV}','M_{PGD}','location','southeast'); set(leg,'box','off');
ylabel('Magnitude'); xlabel('Mw'); grid on; set(gca,'GridLineStyle',':','GridColor',[0.8 0.8
0.8],'GridAlpha',1); set(gca,'fontsize',18,'fontname','Times New Roman');

```



## 21 文字云

```

clc;clear;close all;fclose all; %%
prepare data
strs={'测绘学报','地球物理学报','武汉大学学报(信息科学版)',...
'测绘地理信息','大地测量与地球动力学','测绘通报',...
'导航定位与授时','全球定位系统','中国科学：地球科学',...
'Geophysical Research Letters',...
'Journal of Geophysical Research: Solid Earth',...
'Geophysical Journal International','Journal of Geodesy',...
'GPS Solutions','Seismological Research Letters',...
'ADVANCES IN SPACE RESEARCH','Remote Sensing','SENSORS'};
num=length(strs); s=rand(num,1); % size c=rand(num,3); % color %%
figure figure; set(gcf,'position',[300,100,800,650],'color','w');
wordcloud(strs,s,'color',c,'shape','oval'); % oval rectangle title('The word
cloud of academic journal');

```

The word cloud of academic journal

Geophysical Research Letters  
武汉大学学报(信息科学版)  
中国科学: 地球科学  
GPS Solutions  
大地测量与地球动力学 导航定位与授时  
Journal of Geodesy  
测绘学报  
SENSORS 测绘通报  
Geophysical Journal International  
Remote Sensing  
ADVANCES IN SPACE RESEARCH  
Seismological Research Letters  
Journal of Geophysical Research: Solid Earth

路佳山下图书馆