tikz 画图

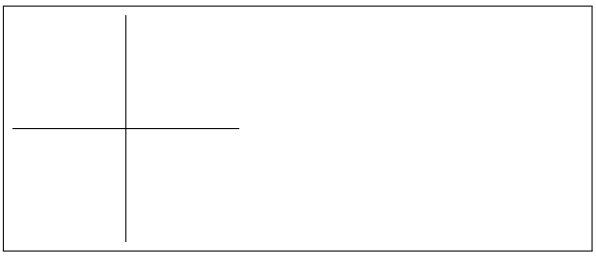
2019 年 10 月 4 日

1 简单图形

1.1 直线

```
\begin{tikzpicture}
  \draw (1,0) -- (0,0) -- (0,1);
\end{tikzpicture}
```

```
\begin{tikzpicture}
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
\end{tikzpicture}
```

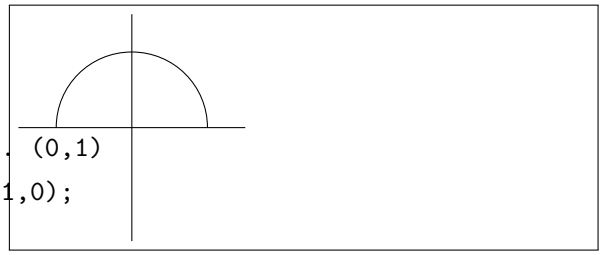


1.2 绘制曲线

```
\begin{tikzpicture}
  \filldraw[gray] (0,0) circle [radius=2pt]
                  (1,1) circle [radius=2pt]
                  (2,1) circle [radius=2pt]
                  (2,0) circle [radius=2pt];
  \draw (0,0) .. controls (0,0) and (2,1) .. (2,0);

\end{tikzpicture}
```

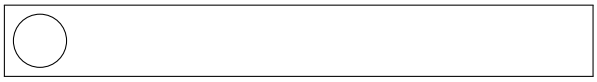
可以通过这种方式画圆:

```
\begin{tikzpicture}
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (-1,0) .. controls (-1,0.555) and (-0.555,1) .. (0,1)
               .. controls (0.555,1) and (1,0.555) ..(1,0);
\end{tikzpicture}
```



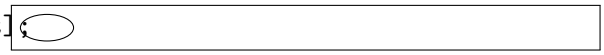
1.3 绘制圆形

```
\tikz \draw (0,0) circle [radius=10pt];
```



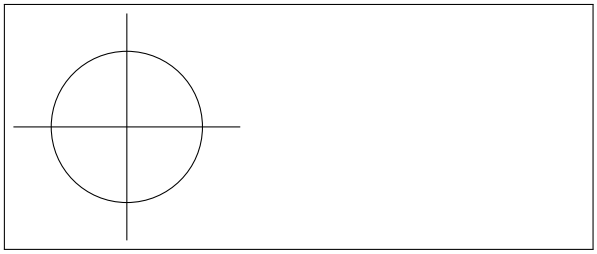
椭圆

```
\tikz \draw (0,0) ellipse [x radius=10pt, y radius=5pt];
```



接下来可以这样画圆形

```
\begin{tikzpicture}
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
\end{tikzpicture}
```

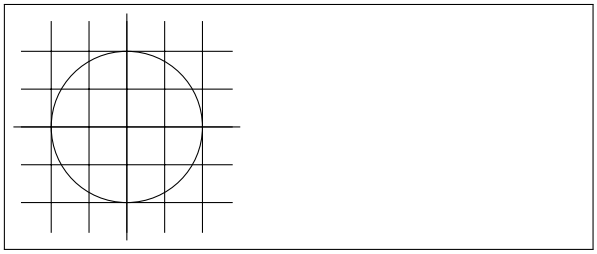


1.4 方形

```
\tikz \draw (-0.5,-0.5) rectangle (-1,-1);
```

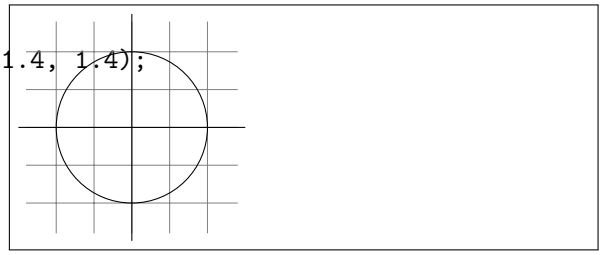
1.5 绘制网格

```
\begin{tikzpicture}
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
  \draw[step=.5cm] (-1.4,-1.4) grid (1.4, 1.4);
\end{tikzpicture}
```



然后将网格美化成灰色

```
\begin{tikzpicture}
  \draw[step=.5cm, gray, very thin] (-1.4,-1.4) grid (1.4, 1.4);
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
\end{tikzpicture}
```



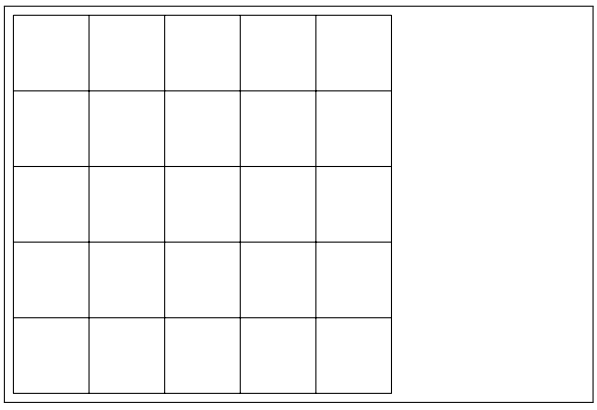
1.6 增加风格

提前设置风格会让代码更加灵活

```
\tikzset{help lines/.style=very thin}
\tikzset{Karl's grid/.style={help lines, color=blue!50}}
```

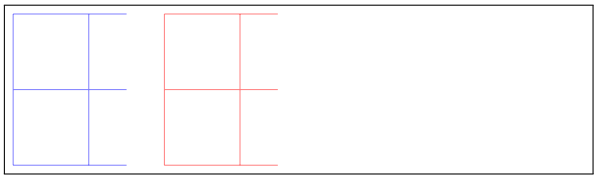
之后可以这样画图

```
\begin{tikzpicture}
  \draw[karl's grid] (0,0) grid(5,5);
\end{tikzpicture}
```



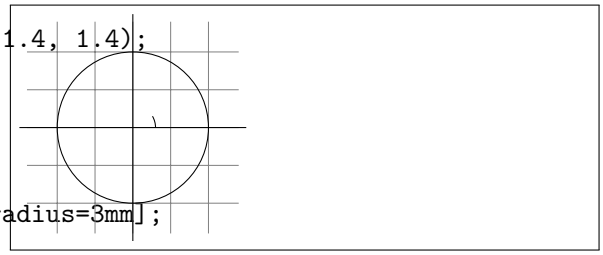
风格也可以作为 tikzpicture 的参数

```
\begin{tikzpicture}[
  my_grid/.style={help lines, color=#1!50},
  my_grid/.default=blue]

  \draw [my_grid] (0,0) grid (1.5,2);
  \draw [my_grid=red] (2,0) grid (3.5,2);

\end{tikzpicture}
```



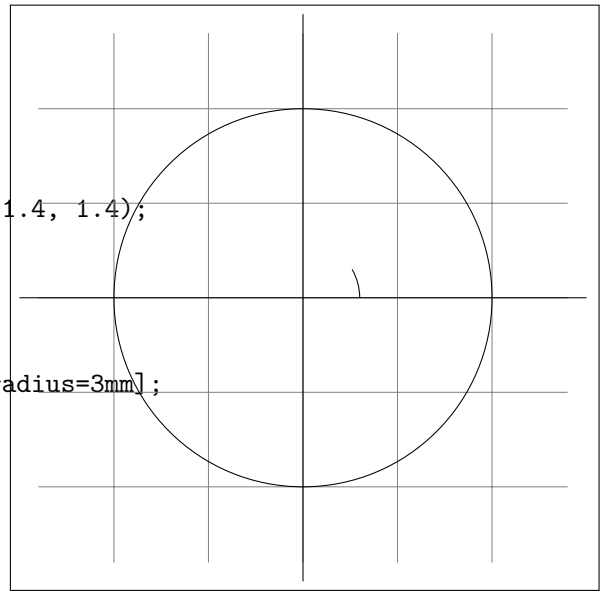
1.7 画弧

```
\begin{tikzpicture}
  \draw[step=.5cm, gray, very thin] (-1.4,-1.4) grid (1.4, 1.4);
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
  \draw (3mm, 0mm) arc [start angle=0, end angle=30, radius=3mm];
\end{tikzpicture}
```



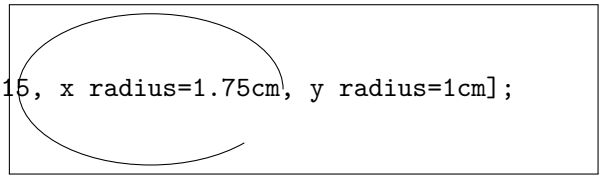
可以用参数放大

```
\begin{tikzpicture}[scale=2.5]
  \draw[step=.5cm, gray, very thin] (-1.4,-1.4) grid (1.4, 1.4);
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
  \draw (3mm, 0mm) arc [start angle=0, end angle=30, radius=3mm];
\end{tikzpicture}
```



也可以使用两个参数让圆弧变成椭圆弧线

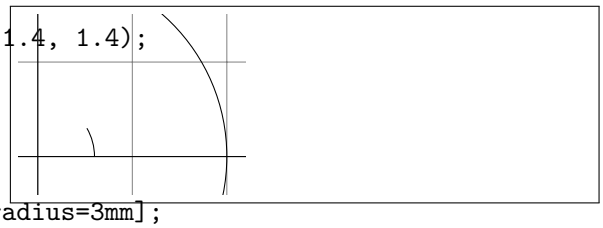
```
\tikz \draw (0mm, 0mm) arc [start angle=0, end angle=315, x radius=1.75cm, y radius=1cm];
```



1.8 剪辑弧线

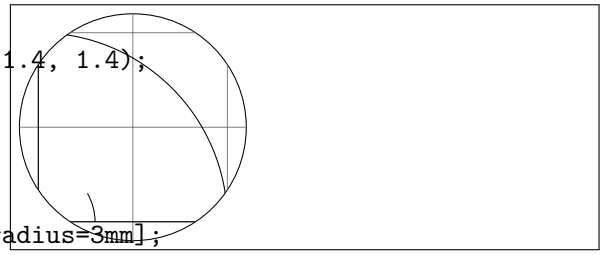
可以用
clip 命令只显示一部分, 在
draw 之前使用

```
\begin{tikzpicture}[scale=2.5]
  \clip (-0.1, -0.2) rectangle (1.1,0.75);
  \draw[step=.5cm, gray, very thin] (-1.4,-1.4) grid (1.4, 1.4);
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
  \draw (3mm, 0mm) arc [start angle=0, end angle=30, radius=3mm];
\end{tikzpicture}
```



也可以绘制并裁剪

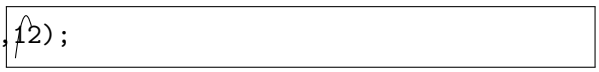
```
\begin{tikzpicture}[scale=2.5]
  \clip[draw] (0.5, 0.5) circle (.6cm);
  \draw[step=.5cm, gray, very thin] (-1.4,-1.4) grid (1.4, 1.4);
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
  \draw (3mm, 0mm) arc [start angle=0, end angle=30, radius=3mm];
\end{tikzpicture}
```



1.9 抛物线和正弦线

```
\tikz \draw (0,0) rectangle (1,1) (0,0) parabola (1,1);
```

```
\tikz \draw [x=1pt,y=1pt](0,0) parabola bend (4,16) (6,12);
```



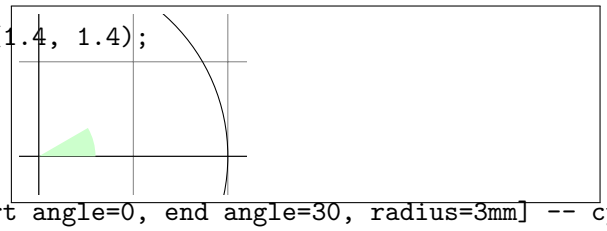
也可以画正弦曲线

```
A sine \tikz \draw [x=1ex,y=1ex] (0,0) sin (1.57,1); curve
```

A sine ⌒ curve

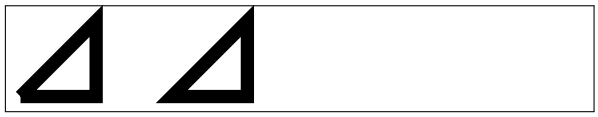
1.9.1 绘图并填充

```
\begin{tikzpicture}[scale=2.5]
  \clip (-0.1,-0.2) rectangle (1.1,0.75);
  \draw[step=.5cm, gray, very thin] (-1.4,-1.4) grid (1.4, 1.4);
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
  \fill[green!20!white] (0, 0) -- (3mm, 0mm) arc [start angle=0, end angle=30, radius=3mm] -- cycle;
\end{tikzpicture}
```



颜色 green!20!white 是说 20% 绿色和 80% 混合. –cycle 语句是路径闭合

```
\begin{tikzpicture}[line width=5pt]
  \draw (0,0) -- (1,0) -- (1,1) -- (0,0);
  \draw (2,0) -- (3,0) -- (3,1) -- cycle;
\end{tikzpicture}
```



现在可以绘制并填充

```
\begin{tikzpicture}[scale=3]
  \clip (-0.1,-0.2) rectangle (1.1,0.75);
  \draw[step=.5cm, gray, very thin] (-1.4,-1.4) grid (1.4, 1.4);
  \draw (-1.5,0) -- (1.5,0);
  \draw (0,-1.5) -- (0,1.5);
  \draw (0,0) circle [radius=1cm];
  \filldraw[fill=green!20!white, draw=green!50!white] (0, 0) -- (3mm, 0mm) arc [start angle=0, end a
\end{tikzpicture}
```