1 通过向量定义点

1.1 \tkzDefPointWith命令：定义向量点

可通过多种方案定义满足特定向量条件的点，此时，需要用两个点作为参数，也就是一个向量。不同的选项用于设置通过共线向量或正交向量的方式定义新点，向量的长度可以与第 1 个向量的长度成正比，也可以与单位向量成正比。如果该点仅做临时使用，则不需要立即命名，使用\tkzPointResult命令即可。也可使用\tkzGetPoint命令保存该点，并为其命名。
可以通过选项设置指定点与所求点之间的距离，通常，该距离是参数中给定 2 个点之间的距离，如果使用了“normed”选项，则定义的点的距离为 1 cm。然后可以通过比例系数 K 选项对其进行缩放。

\tkzDefPointWith(⟨pt1,pt2⟩)

是满足向量条件的点的定义。

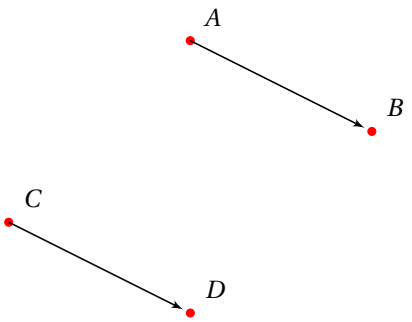
参数	含义	说明
(pt1,pt2)	点对	结果是保存于\tkzPointResult命令

假定由\tkzGetPoint{C}得到该点。

选项	样例	说明
orthogonal	[orthogonal](A,B)	$AC = AB$ 和 $\overrightarrow{AC} \perp \overrightarrow{AB}$
orthogonal normed	[orthogonal normed](A,B)	$AC = 1$ 和 $\overrightarrow{AC} \perp \overrightarrow{AB}$
linear	[linear](A,B)	$\overrightarrow{AC} = K \times \overrightarrow{AB}$
linear normed	[linear normed](A,B)	$AC = K$ 和 $\overrightarrow{AC} = k \times \overrightarrow{AB}$
colinear= at #1	[colinear= at C](A,B)	$\overrightarrow{CD} = \overrightarrow{AB}$
colinear normed= at #1	[colinear normed= at C](A,B)	$\overrightarrow{CD} = \overrightarrow{AB}$
K	[linear](A,B),K=2	$\overrightarrow{AC} = 2 \times \overrightarrow{AB}$

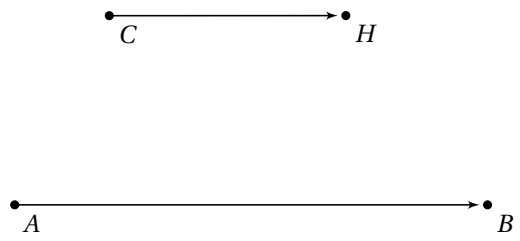
1.1.1 colinear at选项示例

$(\overrightarrow{AB} = \overrightarrow{CD})$



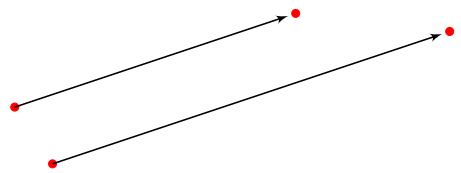

```
\begin{tikzpicture}[vect/.style={->, shorten >=3pt,
                    >=latex'}, scale=1.2]
  \tkzDefPoint(2,3){A}
  \tkzDefPoint(4,2){B}
  \tkzDefPoint(0,1){C}
  \tkzDefPointWith[colinear=at C](A,B)
  \tkzGetPoint{D}
  \tkzDrawPoints[color=red](A,B,C,D)
  \tkzLabelPoints[above right=3pt](A,B,C,D)
  \tkzDrawSegments[vect](A,B C,D)
\end{tikzpicture}
```

1.1.2 colinear at带 K 选项示例




```
\begin{tikzpicture}[vect/.style={->, shorten >=3pt,
                    >=latex'}, scale=1.25]
  \tkzDefPoint(0,0){A}  \tkzDefPoint(5,0){B}
  \tkzDefPoint(1,2){C}
  \tkzDefPointWith[colinear=at C](A,B)
  \tkzGetPoint{G}
  \tkzDefPointWith[colinear=at C,K=0.5](A,B)
  \tkzGetPoint{H}
  \tkzLabelPoints(A,B,C,G,H)
  \tkzDrawPoints(A,B,C,G,H)
  \tkzDrawSegments[vect](A,B C,H)
\end{tikzpicture}
```

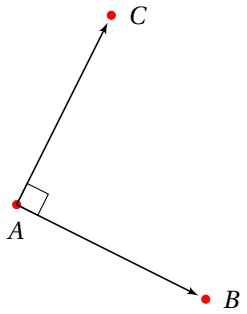
1.1.3 colinear at带 $K = \frac{\sqrt{2}}{2}$ 选项示例



```
\begin{tikzpicture}[vect/.style={->, shorten >=3pt,
                    >=latex'}, scale=1.75]
  \tkzDefPoint(1,1){A}  \tkzDefPoint(4,2){B}
  \tkzDefPoint(2,2){CU}
  \tkzDefPointWith[colinear=at C,K=sqrt(2)/2](A,B)
  \tkzGetPoint{D}
  \tkzDrawPoints[color=red](A,B,C,D)
  \tkzDrawSegments[vect](A,B C,D)
\end{tikzpicture}
```

1.1.4 orthogonal选项示例

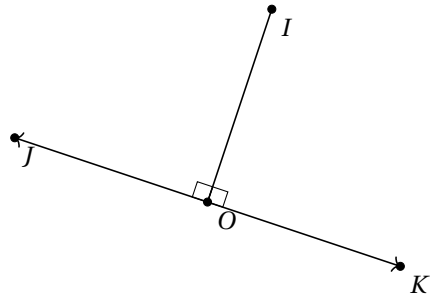
因 $K = 1$，所以 $AB = AC$。




```
\begin{tikzpicture}[vect/.style={->,shorten >=3pt,
                    >=latex'},scale=1.25]
  \tkzDefPoint(2,3){A}  \tkzDefPoint(4,2){B}
  \tkzDefPointWith[orthogonal,K=1](A,B)
  \tkzGetPoint{C}
  \tkzDrawPoints[color=red](A,B,C)
  \tkzLabelPoints[right=3pt](B,C)
  \tkzLabelPoints[below=3pt](A)
  \tkzDrawSegments[vect](A,B A,C)
  \tkzMarkRightAngle(B,A,C)
\end{tikzpicture}
```

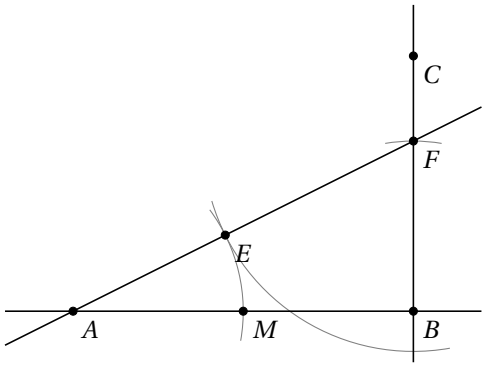
1.1.5 orthogonal带 $K = -1$ 选项示例

因 $|K| = 1$，所以 $OI = OJ = OK$。



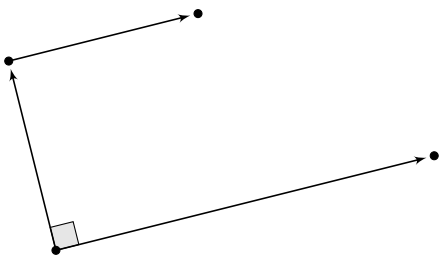

```
\begin{tikzpicture}[scale=0.85]
  \tkzDefPoint(1,2){O}  \tkzDefPoint(2,5){I}
  \tkzDefPointWith[orthogonal](O,I)
  \tkzGetPoint{J}
  \tkzDefPointWith[orthogonal,K=-1](O,I)
  \tkzGetPoint{K}
  \tkzDrawSegment(O,I)
  \tkzDrawSegments[->](O,J O,K)
  \tkzMarkRightAngles(I,O,J I,O,K)
  \tkzDrawPoints(O,I,J,K)
  \tkzLabelPoints(O,I,J,K)
\end{tikzpicture}
```

1.1.6 orthogonal选项综合示例




```
\begin{tikzpicture}[scale=0.75]
  \tkzDefPoints{0/0/A,6/0/B}
  \tkzDefMidPoint(A,B)
  \tkzGetPoint{I}
  \tkzDefPointWith[orthogonal,K=-.75](B,A)
  \tkzGetPoint{C}
  \tkzInterLC(B,C)(B,I)
  \tkzGetPoints{D}{F}
  \tkzDuplicateSegment(B,F)(A,F)
  \tkzGetPoint{E}
  \tkzDrawArc[delta=10](F,E)(B)
  \tkzInterLC(A,B)(A,E)
  \tkzGetPoints{N}{M}
  \tkzDrawArc[delta=10](A,M)(E)
  \tkzDrawLines(A,B B,C A,F)
  \tkzCompass(B,F)
  \tkzDrawPoints(A,B,C,F,M,E)
  \tkzLabelPoints(A,B,C,F,M,E)
\end{tikzpicture}
```

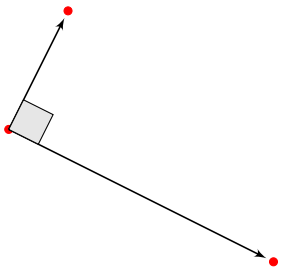
1.1.7 colinear和orthogonal选项示例



```
\begin{tikzpicture}[vect/.style={->,shorten >=3pt,
                    >=latex'}, scale=1.25]
  \tkzDefPoint(2,1){A}
  \tkzDefPoint(6,2){B}
  \tkzDefPointWith[orthogonal,K=.5](A,B)
  \tkzGetPoint{C}
  \tkzDefPointWith[colinear=at C,K=.5](A,B)
  \tkzGetPoint{D}
  \tkzMarkRightAngle[fill=gray!20](B,A,C)
  \tkzDrawSegments[vect](A,B A,C C,D)
  \tkzDrawPoints(A,...,D)
\end{tikzpicture}
```

1.1.8 orthogonal normed带 $K = 1$ 选项示例

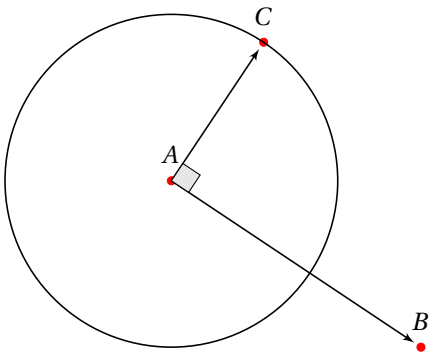
$AC = 1$.



```
\begin{tikzpicture}[vect/.style={->,shorten >=3pt,
                    >=latex'},scale=1.75]
  \tkzDefPoint(2,3){A}
  \tkzDefPoint(4,2){B}
  \tkzDefPointWith[orthogonal normed](A,B)
  \tkzGetPoint{C}
  \tkzDrawPoints[color=red](A,B,C)
  \tkzDrawSegments[vect](A,B A,C)
  \tkzMarkRightAngle[fill=gray!20](B,A,C)
\end{tikzpicture}
```

1.1.9 orthogonal normed和 $K=2$ 选项示例

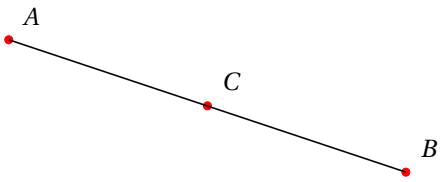
因 $K=2$，所以 $AC=2$。




```
\begin{tikzpicture}[vect/.style={->,shorten >=3pt,
                    >=latex'}, scale=1.10]
  \tkzDefPoint(2,3){A}
  \tkzDefPoint(5,1){B}
  \tkzDefPointWith[orthogonal normed,K=2](A,B)
  \tkzGetPoint{C}
  \tkzDrawPoints[color=red](A,B,C)
  \tkzDrawCircle[R](A,2cm)
  \tkzDrawSegments[vect](A,B A,C)
  \tkzMarkRightAngle[fill=gray!20](B,A,C)
  \tkzLabelPoints[above=3pt](A,B,C)
\end{tikzpicture}
```

1.1.10 linear选项示例

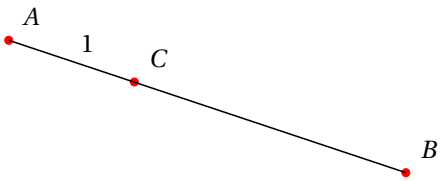
在此，取 $K=0.5$。
这相当于给一个向量乘了一个实数，本例中是 $[AB]$ 的中点。




```
\begin{tikzpicture}[scale=1.75]
  \tkzDefPoint(1,3){A}
  \tkzDefPoint(4,2){B}
  \tkzDefPointWith[linear,K=0.5](A,B)
  \tkzGetPoint{C}
  \tkzDrawPoints[color=red](A,B,C)
  \tkzDrawSegment(A,B)
  \tkzLabelPoints[above right=3pt](A,B,C)
\end{tikzpicture}
```

1.1.11 linear normed选项示例

在下面的实例中，$AC=1$ 并且 C 属于 (AB)。




```
\begin{tikzpicture}[scale=1.75]
  \tkzDefPoint(1,3){A}
  \tkzDefPoint(4,2){B}
  \tkzDefPointWith[linear normed](A,B)
  \tkzGetPoint{C}
  \tkzDrawPoints[color=red](A,B,C)
  \tkzDrawSegment(A,B)
  \tkzLabelSegment(A,C){$1$}
  \tkzLabelPoints[above right=3pt](A,B,C)
\end{tikzpicture}
```

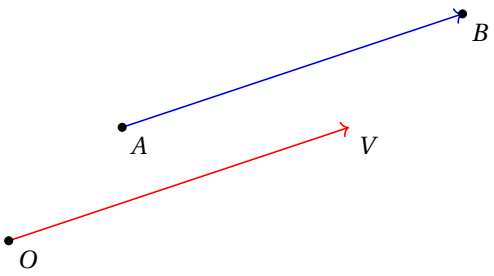
1.2 \tkzGetVectxy命令：获取向量坐标分量

\tkzGetVectxy(⟨A,B⟩){⟨text⟩}

获得一个向量的坐标分量。

参数	样例	说明
(point){name of macro}	\tkzGetVectxy(A,B){V}	\Vx,\Vy向量 $\overrightarrow{AB}$ 的坐标分量

1.2.1 使用\tkzGetVectxy命令实现坐标变换




```
\begin{tikzpicture}[scale=1.5]
  \tkzDefPoint(0,0){O}
  \tkzDefPoint(1,1){A}
  \tkzDefPoint(4,2){B}
  \tkzGetVectxy(A,B){v}
  \tkzDefPoint(\vx,\vy){V}
  \tkzDrawSegment[->,color=red](O,V)
  \tkzDrawSegment[->,color=blue](A,B)
  \tkzDrawPoints(A,B,O)
  \tkzLabelPoints(A,B,O,V)
\end{tikzpicture}
```