Section 射影空间

$\mathbb{RP}^n = \{[z_0, \cdots, z_n] : z_i \text{不全为} 0\}$

Theorem. Lebesgue 数引理

X 紧度量空间，$\mathcal{U}$ 为 X 的开覆盖

$\Rightarrow \exists\ r>0,\ \forall\ x\in X,\ \exists\ U\in\mathcal{U}$ s.t. $B(x,r)\subset U$

Section: 环绕数 (Winding Number)

$$\begin{aligned}
Wind(\gamma,p) &= \frac{1}{2\pi}\int_{\gamma} d\theta \\
&= \frac{1}{2\pi}\int_{\gamma} d\left(\arctan\frac{x'}{y'}\right) \\
&= \frac{1}{2\pi}\int_{\gamma} \frac{1}{1+\left(\frac{x'}{y'}\right)^2}\, d\frac{x'}{y'} \\
&= \frac{1}{2\pi}\int_{\gamma} \frac{(x-x_0)dy-(y-y_0)dx}{(x-x_0)^2+(y-y_0)^2}
\end{aligned}$$