



Def'n: $k > 0$. Suppose $M \subset \mathbb{R}^n$ with the following property: For every $p \in M$, there is a set V containing p that is open in M , a set U open in \mathbb{R}^k , and a continuous map $\alpha: U \xrightarrow{1-1} V$ such that

(1) α is of class C^∞

(2) $\alpha^{-1}: V \rightarrow U$ is continuous, and

(3) $D\alpha(x)$ has rank k for each $x \in U$.

Then M is a smooth k -manifold without boundary. The map α is called a coordinate patch on M about p .