Definition 21.12. *[1PB] Let (X, d) be a metric space. Let $I = [a, b] \subseteq \mathbb{R}$ be a closed and bounded interval. Let $\gamma : I \to X$ be a parametric curve.*

- *If $\gamma(a) = \gamma(b)$ we will say that the curve is **closed**;*

- *we also say that the curve is **simple and closed** if $\gamma(a) = \gamma(b)$ and γ is injective when restricted to $[a, b)$. [a]*

- *If $X = \mathbb{R}^n$ and γ is class C^1 and is closed, it is further assumed that $\gamma'(a) = \gamma'(b)$.*

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[a] That is, the injectivity is lost in the extremes.