Multivariable Calculus Reference

Sidharth Baskaran

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1 Paths whose image curve is a circle

1.1 Unit Circle

Unit circle is set of points in $\mathbb{R}^2$ defined as $C = \{(x, y) \in \mathbb{R}^2 | x^2 + y^2 = 1\}$. Has standard parameterization of $\vec{c}(t) = \big(\cos(t), \sin(t)\big)$.

Properties

- Image of $\vec{c}$ is a closed curve (has no endpoints, plane is divided into ≥ 2 disjoint regions)

- Image of $\vec{c}$ is a simple curve; no self-intersection

- $\vec{c}(t)$ is an injective path; path is considered injective if $\vec{c}(t_1) = \vec{c}(t_2)$, which implies that $t_1 = t_2$ where these are on the open interval (a, b) even if $a = b$

- Orientation of $\vec{c}$ is counter-clockwise in traversal