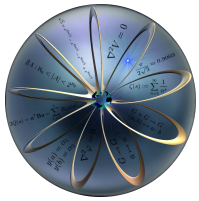

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period of mapping

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Definition Suppose X is a set and f is a mapping $f : X \to X$. If f^n is the identity mapping on X for some $n = 1, 2, \ldots$, then f is said to be a **mapping of period** n. Here, the notation f^n means the n-fold composition $f \circ \cdots \circ f$.

0.0.1 Examples

1. A mapping f is of period 1 if and only if f is the identity mapping.
2. Suppose V is a vector space. Then a linear involution $L : V \to V$ is a mapping of period 2. For example, the reflection mapping $x \mapsto -x$ is a mapping of period 2.
3. In the complex plane, the mapping $z \mapsto e^{-2\pi i/n} z$ is a mapping of period n for $n = 1, 2, \ldots$.
4. Let us consider the function space spanned by the trigonometric functions sin and cos. On this space, the derivative is a mapping of period 4.

0.0.2 Properties

1. Suppose X is a set. Then a mapping $f : X \to X$ of period n is a bijection. `http://planetmath.org/MappingOfDegreeNIsASurjection`(proof.)
2. Suppose X is a topological space. Then a continuous mapping $f : X \to X$ of period n is a homeomorphism.