Topologija

Monday, April 5, 2021 10:37 PM

TOPOLOGIJA – PROSTORI IN PRESLIKAVE

network topology

topology of concurrent computing

topology control

topology of distributed computing

topological sensor networks

topological quantum computing

topological data analysis

topology of algorithms

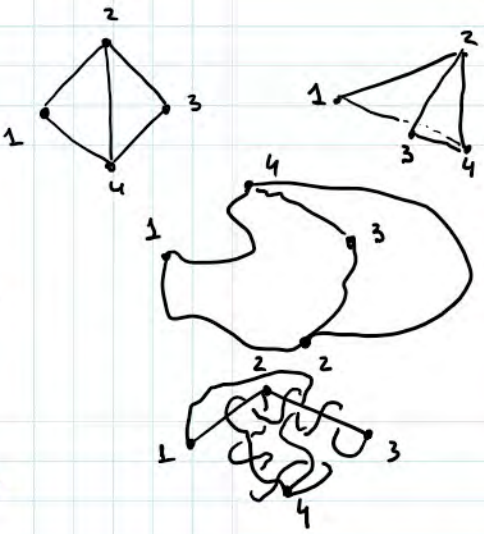
computational topology

digital topology

topological robotics

physical topology

logical topology



Kaj je topologija?

From Wikipedia, the free encyclopedia

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This article is about the branch of mathematics. For the mathematical structure, see Topological space. For other uses, see Topology (disambiguation).

Not to be confused with topography or typology.

Möbius strips, which have only one surface and one edge, are a kind of object studied in topology.

In mathematics, **topology** (from the Greek words τόπος, 'place, location', and λόγος, 'study') is concerned with the properties of a geometric object that are preserved under continuous deformations, such as stretching, twisting, crumpling and bending.

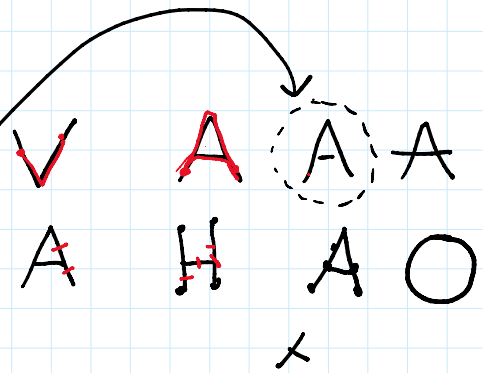
A topological space is a set endowed with a structure, called a *topology*, which allows defining continuous deformation of subspaces, and, more generally, all kinds of continuity. Euclidean spaces, and, more generally, metric spaces are examples of a topological space, as any distance or metric defines a topology. The deformations that are considered in topology are homeomorphisms and homotopies. A property that is invariant under such deformations is a topological property. Basic examples of topological properties are: the dimension, which allows distinguishing between a line and a surface; compactness, which allows distinguishing between a line and a circle; connectedness, which allows distinguishing a circle from two non-intersecting circles.

The ideas underlying topology go back to Gottfried Leibniz, who in the 17th century envisioned the *geometria situs* and *analysis situs*. Leonhard Euler's Seven Bridges of Königsberg problem and polyhedron formula are arguably the field's first theorems. The term *topology* was introduced by Johann Benedict Listing in the 19th century, although it was not until the first decades of the 20th century that the idea of a topological space was

From <https://en.wikipedia.org/wiki/Topology>

Topologija je študij geometrijskih lastnosti, ki se ohranjajo

do zvezni spremembi oblike ali velikosti objektov.

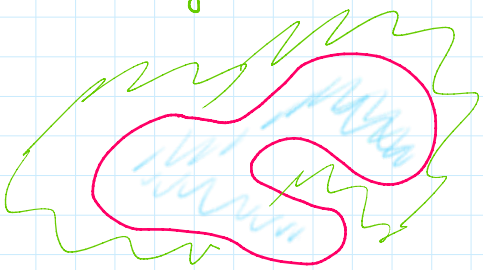


Primeri

(1) U ~ V ≠ A
= L ≠ H
= C ≠ Č ≈ Š = Ž ≠ Ž

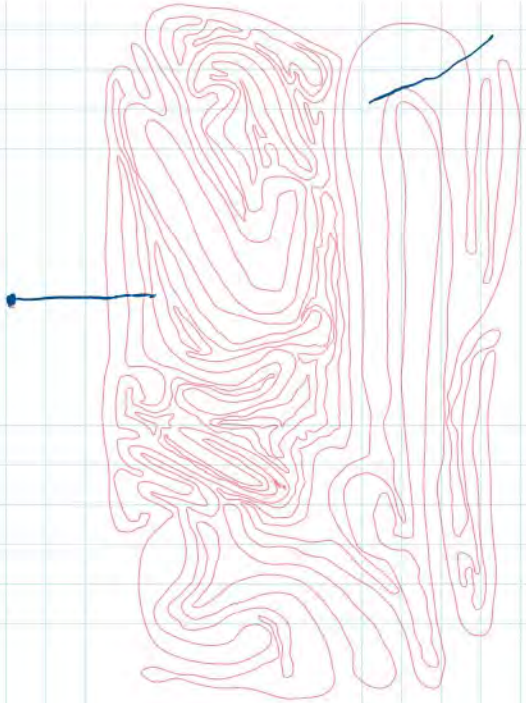
(2)

Krožnica razdeli ravnino na dva dela, notranjost in zunanjost



To ne velja le za krožnico, temveč za poljubno sklenjeno krivuljo.

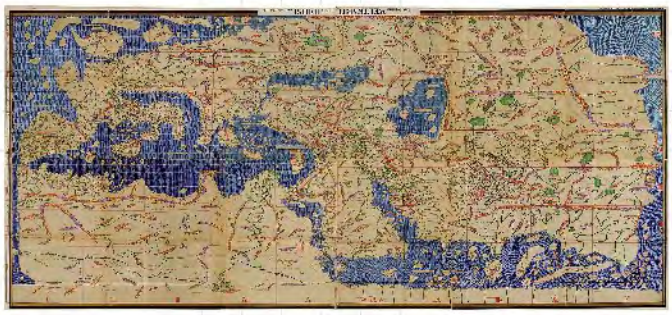
Očitno?



Jordanov izrek

Vsaka enostavna sklenjena krivulja razdeli ravnino na notranjost in zunanjost.

(3) Kaj je na spodnji sliki?



Bistveni korak pri prehodu iz geometrije v topologijo je opredelitev 'bližine' oz. bližnje okolice brez sklicevanja na razdaljo (metriko). Podobno opišemo tudi funkcije, ki ta pojem bližine ohranjajo.

Spomnimo se, da smo v analizi za neko množico rekli, da je odprta, če je $\forall$ vsako točko vsebovala tudi njeno bližnjo okolico

množica A je odprta, če so vse točke A notranje

Definicija X poljubna množica

Topološka struktura (krajše topologija) na X je podana z družino odprtih množic $\mathcal{T}$, ki zadošča dvem preprostim zahtevam:

(T1) unija poljubne družine elementov $\mathcal{T}$ je element $\mathcal{T}$
(T2) presek končne družine elementov $\mathcal{T}$ je element $\mathcal{T}$

$\mathcal{T}$ je zaprta za poljubne unije in končne preseke

Opombe:

(1) Odprte množice v Analizi: = vse točke so notranje

$\mathcal{T} := \{$ odprte podmnožice ravnine$\}$ je topologija