

Topology Solution

Low-dimensional topology

starting in the 1960s had the effect of emphasising low dimensions in topology. The solution by Stephen Smale, in 1961, of the Poincaré conjecture in five or

In mathematics, low-dimensional topology is the branch of topology that studies manifolds, or more generally topological spaces, of four or fewer dimensions. Representative topics are the theory of 3-manifolds and 4-manifolds, knot theory, and braid groups. This can be regarded as a part of geometric topology. It may also be used to refer to the study of topological spaces of dimension 1, though this is more typically considered part of continuum theory.

General topology

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In mathematics, general topology (or point set topology) is the branch of topology that deals with the basic set-theoretic definitions and constructions used in topology. It is the foundation of most other branches of topology, including differential topology, geometric topology, and algebraic topology.

The fundamental concepts in point-set topology are continuity, compactness, and connectedness:

Continuous functions, intuitively, take nearby points to nearby points.

Compact sets are those that can be covered by finitely many sets of arbitrarily small size.

Connected sets are sets that cannot be divided into two pieces that are far apart.

The terms 'nearby', 'arbitrarily small', and 'far apart' can all be made precise by using the concept of open sets. If we change the definition of 'open...

Network topology

Network topology is the arrangement of the elements (links, nodes, etc.) of a communication network. Network topology can be used to define or describe

Network topology is the arrangement of the elements (links, nodes, etc.) of a communication network. Network topology can be used to define or describe the arrangement of various types of telecommunication networks, including command and control radio networks, industrial fieldbuses and computer networks.

Network topology is the topological structure of a network and may be depicted physically or logically. It is an application of graph theory wherein communicating devices are modeled as nodes and the connections between the devices are modeled as links or lines between the nodes. Physical topology is the placement of the various components of a network (e.g., device location and cable installation), while logical topology illustrates how data flows within a network. Distances between nodes...

Electronic filter topology

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Electronic filter topology defines electronic filter circuits without taking note of the values of the components used but only the manner in which those components are connected.

Filter design characterises filter circuits primarily by their transfer function rather than their topology. Transfer functions may be linear or nonlinear. Common types of linear filter transfer function are; high-pass, low-pass, bandpass, band-reject or notch and all-pass. Once the transfer function for a filter is chosen, the particular topology to implement such a prototype filter can be selected so that, for example, one might choose to design a Butterworth filter using the Sallen-Key topology.

Filter topologies may be divided into passive and active types. Passive topologies are composed exclusively of passive...

Comparison of topologies

In topology and related areas of mathematics, the set of all possible topologies on a given set forms a partially ordered set. This order relation can

In topology and related areas of mathematics, the set of all possible topologies on a given set forms a partially ordered set. This order relation can be used for comparison of the topologies.

Topology optimization

analytical solution. There are various implementation methodologies that have been used to solve topology optimization problems. Solving topology optimization

Topology optimization is a mathematical method that optimizes material layout within a given design space, for a given set of loads, boundary conditions and constraints with the goal of maximizing the performance of the system. Topology optimization is different from shape optimization and sizing optimization in the sense that the design can attain any shape within the design space, instead of dealing with predefined configurations.

The conventional topology optimization formulation uses a finite element method (FEM) to evaluate the design performance. The design is optimized using either gradient-based mathematical programming techniques such as the optimality criteria algorithm and the method of moving asymptotes or non gradient-based algorithms such as genetic algorithms.

Topology optimization...

Circuit topology (electrical)

The circuit topology of an electronic circuit is the form taken by the network of interconnections of the circuit components. Different specific values

The circuit topology of an electronic circuit is the form taken by the network of interconnections of the circuit components. Different specific values or ratings of the components are regarded as being the same topology. Topology is not concerned with the physical layout of components in a circuit, nor with their positions on a circuit diagram; similarly to the mathematical concept of topology, it is only concerned with what connections exist between the components. Numerous physical layouts and circuit diagrams may all amount to the same topology.

Strictly speaking, replacing a component with one of an entirely different type is still the same topology. In some contexts, however, these can loosely be described as different topologies. For instance, interchanging inductors and capacitors...

Nisnevich topology

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In algebraic geometry, the Nisnevich topology, sometimes called the completely decomposed topology, is a Grothendieck topology on the category of schemes which has been used in algebraic K-theory, A^1 homotopy theory, and the theory of motives. It was originally introduced by Yevsey Nisnevich, who was motivated by the theory of adèles.

Computational topology

Algorithmic topology, or computational topology, is a subfield of topology with an overlap with areas of computer science, in particular, computational

Algorithmic topology, or computational topology, is a subfield of topology with an overlap with areas of computer science, in particular, computational geometry and computational complexity theory.

A primary concern of algorithmic topology, as its name suggests, is to develop efficient algorithms for solving problems that arise naturally in fields such as computational geometry, graphics, robotics, social science, structural biology, and chemistry, using methods from computable topology.

Topological space

elements are called points, along with an additional structure called a topology, which can be defined as a set of neighbourhoods for each point that satisfy

In mathematics, a topological space is, roughly speaking, a geometrical space in which closeness is defined but cannot necessarily be measured by a numeric distance. More specifically, a topological space is a set whose elements are called points, along with an additional structure called a topology, which can be defined as a set of neighbourhoods for each point that satisfy some axioms formalizing the concept of closeness. There are several equivalent definitions of a topology, the most commonly used of which is the definition through open sets.

A topological space is the most general type of a mathematical space that allows for the definition of limits, continuity, and connectedness. Common types of topological spaces include Euclidean spaces, metric spaces and manifolds.

Although very general...

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