Research & Reviews: Journal of Statistics and Mathematical Sciences

Continuous Functions and Homeomorphisms of Topology and its uses in Real Life

Joseph Steve*

Department of Mathematics, Bhiksu University of Sri Lanka, Anuradhapura, Sri Lanka

Commentary

Received: 24-Nov-2022, Manuscript No. JSMS-22-83618; **Editor assigned:** 29-Nov-2022, Pre QC No. JSMS-22-83618 (PQ); **Reviewed:** 14-Dec-2022, QC No. JSMS-22-83618; **Revised:** 21-Dec-2022, Manuscript No. JSMS-22-83618 (A); **Published:** 28-Dec-2022, DOI: 10.4172/J Stats Math Sci.8.7.005.

***For Correspondence:**
Joseph Steve, Department of Mathematics, Bhiksu University of Sri Lanka, Anuradhapura, Sri Lanka
E-mail: stevejose@yahoo.com

DESCRIPTION

Topology is the study of the properties of a dimensional object that are preserved under constant deformations such as stretching, twisting, crumpling, and bending; that is, without closing, opening, tearing, glueing, or passing through itself. A topological space is a set that has a structure called an array that allows for the definition of continuous deformation of subspaces and, more broadly, all types of continuity. Topological spaces include Euclidean spaces and more comprehensively metric spaces, as any range or metric defines a topology. Topology considers homeomorphisms and homotopies as deformations. A topological property is one that is invariant under such elastic deformation. Topological properties include dimension, which differs between a line and a surface; compactness, which distinguishes between a line and a circle; and connectedness, which separates a circle from two non-intersecting circles.

Topology is used in many branches of mathematics, such as differentiable equations, dynamical systems, knot theory, and Riemann surfaces in complex analysis. Homeomorphism is the most fundamental topological equivalence. It is difficult to explain without having a technical or basic idea that two objects are homotopy equivalent if they both result from "squishing" a larger object. A homotopy equivalence class can contain several homeomorphism classes. Homeomorphism is the process of continuously stretching and bending an object into a new shape. A square and a circle are thus homeomorphic, but a sphere and a torus are not. This description, however, can be false. Some continuous deformations, such as the transformation of a line into a point, are not homeomorphisms or continuous deformations. Topology has been used to investigate a wide range of biological systems, including molecules and nanostructures. Circuit topology and knot theory, in particular, have been widely used to categorize and compare the topology of folded proteins and nucleic acids. The pairwise arrangement of intra-chain contacts and chain crossings in folded molecular chains is used to classify them in circuit topology. In biology, knot theory, a branch of topology, is used to study the effects of certain enzymes on DNA. These enzymes cut, twist, and reconnect the DNA, resulting in knotting and visible effects like slower electrophoresis. In evolutionary biology, topology is used to represent the connection between analyses of gene expression. Depending on how genetic changes map to morphological changes during development, phenotypic forms that appear quite different can be separated by only a few mutations. Topological quantities such as the Euler characteristic and the Betti number have been used in neuroscience to quantify the complex nature of activity patterns in neurons.

Topology has applications in physics such as condensed matter physics, quantum theory, and physical cosmology. Mechanical engineering and materials science are both interested in the topological dependence of mechanical properties in solids. The arrangement and network structures of particles and elementary units in components influence their electrical and mechanical properties. The mechanical properties of crumpled topologies are investigated in order to comprehend the high strength-to-weight ratio of such structures, which are mostly empty space. Topology is also important in contact mechanics, where the reliance of stiffness and friction on the dimensional space of surface structures is studied for applications in kinematic physics. A topological quantum field theory is one that computes topological invariants. Topology can be used to describe the complete image of the universe in astrophysics. This field of study is known as space-time topology.