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On topological spaces generated by graphs and vice versa

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ABSTRACT

The relationship between Graph Theory and Topological Space has recently developed greatly , as researchers have been able to find solutions to some problems in daily life by transforming the problem into a graph and then generating a topological space and thus facilitating reading the problem and solving it. The researchers also studied the generation of graph from topological spaces.In this article we will present two types of relations on the edges set that generate topological spaces, and we will discuss some properties of this topology, and we will study discuss the method of returning from the topological space to the graphs through using previous relationships.

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1. Introduction

The graph theory is a fundamental mathematical tool for a wide range of applications for example in computers network and Many problems arising in such different fields as industry, chemistry and electrical engineering, marketing, education and management, can be posed as problems from a in graph theory. It can be said that subjects of mathematics in general have arisen it was developed for the need for applications. For example, geometry arose on the banks of the Nile to measure land,regulate agriculture, topology emerged to address engineering problems and Mathematical analysis that does not depend on distances, algebra arose to regulate transactions. Many People thinking topology is far from applications but in the end of the twentieth century and the beginning of the twenty-first century many directions have been added to the previous directions the topology was in such as modern physics, artificial intelligence, and economics are used Topology was used in the fourth decade of the nineteenth century and the biggest proof of the importance of topology. Recently, some researches have created topologies from graphs using various methods. In 2013, SNF Al-khafaji [7] have constructed a topology on graphs and a topology on subgraphs, and in 2018, KA Abdu [1] have constructed applying the topology on digraphs by associate two topologies with the set of edges of any directed graph, called compatible and incompatible edges topologies. Various relationships were used by researchers, as some researchers presented the relationships that connect the topological space with the graph by means of vertices [6,10,11].

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