5 On Graph

Petersen graph

bridgeless graph has a cycle-continuous mapping to the Petersen graph. More unsolved problems in mathematics In the mathematical field of graph theory, the - In the mathematical field of graph theory, the Petersen graph is an undirected graph with 10 vertices and 15 edges. It is a small graph that serves as a useful example and counterexample for many problems in graph theory. The Petersen graph is named after Julius Petersen, who in 1898 constructed it to be the smallest bridgeless cubic graph with no three-edge-coloring.

Although the graph is generally credited to Petersen, it had in fact first appeared 12 years earlier, in a paper by A. B. Kempe (1886). Kempe observed that its vertices can represent the ten lines of the Desargues configuration, and its edges represent pairs of lines that do not meet at one of the ten points of the configuration.

Donald Knuth states that the Petersen graph is "a remarkable configuration that serves as a counterexample to many optimistic predictions about what might be true for graphs in general."

The Petersen graph also makes an appearance in tropical geometry. The cone over the Petersen graph is naturally identified with the moduli space of five-pointed rational tropical curves.

Planar graph

In graph theory, a planar graph is a graph that can be embedded in the plane, i.e., it can be drawn on the plane in such a way that its edges intersect - In graph theory, a planar graph is a graph that can be embedded in the plane, i.e., it can be drawn on the plane in such a way that its edges intersect only at their endpoints. In other words, it can be drawn in such a way that no edges cross each other. Such a drawing is called a plane graph, or a planar embedding of the graph. A plane graph can be defined as a planar graph with a mapping from every node to a point on a plane, and from every edge to a plane curve on that plane, such that the extreme points of each curve are the points mapped from its end nodes, and all curves are disjoint except on their extreme points.

Every graph that can be drawn on a plane can be drawn on the sphere as well, and vice versa, by means of stereographic projection.

Plane graphs can be encoded by combinatorial maps or rotation systems.

An equivalence class of topologically equivalent drawings on the sphere, usually with additional assumptions such as the absence of isthmuses, is called a planar map. Although a plane graph has an external or unbounded face, none of the faces of a planar map has a particular status.

Planar graphs generalize to graphs drawable on a surface of a given genus. In this terminology, planar graphs have genus 0, since the plane (and the sphere) are surfaces of genus 0. See "graph embedding" for other related topics.

Queen's graph

mathematics, a queen's graph is an undirected graph that represents all legal moves of the queen—a chess piece—on a chessboard. In the graph, each vertex represents - In mathematics, a queen's graph is an undirected graph that represents all legal moves of the queen—a chess piece—on a chessboard. In the graph, each vertex represents a square on a chessboard, and each edge is a legal move the queen can make; that is, a horizontal, vertical or diagonal move by any number of squares. If the chessboard has dimensions

m

×

n

{\displaystyle m\times n}

, then the induced graph is called the

m

×

n

{\displaystyle m\times n}

queen's graph.

Independent sets of the graphs correspond to placements of multiple queens where no two queens are attacking each other. They are studied in the eight queens puzzle, where eight non-attacking queens are placed on a standard

8

×

8

{\displaystyle 8\times 8}

chessboard. Dominating sets represent arrangements of queens where every square is attacked or occupied by a queen; five queens, but no fewer, can dominate the

8

×

8

{\displaystyle 8\times 8}

chessboard.

Colourings of the graphs represent ways to colour each square so that a queen cannot move between any two squares of the same colour; at least n colours are needed for an

n

×

n

{\displaystyle n\times n}

chessboard, but 9 colours are needed for the

8

×

8

{\displaystyle 8\times 8}

board.

Graph coloring

In graph theory, graph coloring is a methodic assignment of labels traditionally called "colors" to elements of a graph. The assignment is subject to certain - In graph theory, graph coloring is a methodic assignment of labels traditionally called "colors" to elements of a graph. The assignment is subject to certain constraints, such as that no two adjacent elements have the same color. Graph coloring is a special case of graph labeling. In its simplest form, it is a way of coloring the vertices of a graph such that no two adjacent vertices are of the same color; this is called a vertex coloring. Similarly, an edge coloring assigns a color to each edge so that no two adjacent edges are of the same color, and a face coloring of a planar graph assigns a color to each face (or region) so that no two faces that share a boundary have the same color.

Vertex coloring is often used to introduce graph coloring problems, since other coloring problems can be transformed into a vertex coloring instance. For example, an edge coloring of a graph is just a vertex coloring of its line graph, and a face coloring of a plane graph is just a vertex coloring of its dual. However, non-vertex coloring problems are often stated and studied as-is. This is partly pedagogical, and partly because some problems are best studied in their non-vertex form, as in the case of edge coloring.

The convention of using colors originates from coloring the countries in a political map, where each face is literally colored. This was generalized to coloring the faces of a graph embedded in the plane. By planar duality it became coloring the vertices, and in this form it generalizes to all graphs. In mathematical and computer representations, it is typical to use the first few positive or non-negative integers as the "colors". In general, one can use any finite set as the "color set". The nature of the coloring problem depends on the number of colors but not on what they are.

Graph coloring enjoys many practical applications as well as theoretical challenges. Beside the classical types of problems, different limitations can also be set on the graph, or on the way a color is assigned, or even on the color itself. It has even reached popularity with the general public in the form of the popular number puzzle Sudoku. Graph coloring is still a very active field of research.

Note: Many terms used in this article are defined in Glossary of graph theory.

Graph labeling

discipline of graph theory, a graph labeling is the assignment of labels, traditionally represented by integers, to edges and/or vertices of a graph. Formally - In the mathematical discipline of graph theory, a graph labeling is the assignment of labels, traditionally represented by integers, to edges and/or vertices of a graph.

Formally, given a graph G = (V, E), a vertex labeling is a function of V to a set of labels; a graph with such a function defined is called a vertex-labeled graph. Likewise, an edge labeling is a function of E to a set of labels. In this case, the graph is called an edge-labeled graph.

When the edge labels are members of an ordered set (e.g., the real numbers), it may be called a weighted graph.

When used without qualification, the term labeled graph generally refers to a vertex-labeled graph with all labels distinct. Such a graph may equivalently be labeled by the consecutive integers { 1, …, |V| } , where |V| is the number of vertices in the graph. For many applications, the edges or vertices are given labels that are meaningful in the associated domain. For example, the edges may be assigned weights representing the "cost" of traversing between the incident vertices.

In the above definition a graph is understood to be a finite undirected simple graph. However, the notion of labeling may be applied to all extensions and generalizations of graphs. For example, in automata theory and formal language theory it is convenient to consider labeled multigraphs, i.e., a pair of vertices may be connected by several labeled edges.

Strongly regular graph

In graph theory, a strongly regular graph (SRG) is a regular graph G = (V, E) with v vertices and degree k such that for some given integers ? , ? ? 0 - In graph theory, a strongly regular graph (SRG) is a regular graph G = (V, E) with v vertices and degree k such that for some given integers

?

,

?

?

0

{\displaystyle \lambda ,\mu \geq 0}

every two adjacent vertices have ? common neighbours, and

every two non-adjacent vertices have ? common neighbours.

Such a strongly regular graph is denoted by srg(v, k, ?, ?). Its complement graph is also strongly regular: it is an srg(v, v ? k ? 1, v ? 2 ? 2k + ?, v ? 2k + ?).

A strongly regular graph is a distance-regular graph with diameter 2 whenever ? is non-zero. It is a locally linear graph whenever ? = 1.

Perfect graph

In graph theory, a perfect graph is a graph in which the chromatic number equals the size of the maximum clique, both in the graph itself and in every - In graph theory, a perfect graph is a graph in which the chromatic number equals the size of the maximum clique, both in the graph itself and in every induced subgraph. In all graphs, the chromatic number is greater than or equal to the size of the maximum clique, but they can be far apart. A graph is perfect when these numbers are equal, and remain equal after the deletion of arbitrary subsets of vertices.

The perfect graphs include many important families of graphs and serve to unify results relating colorings and cliques in those families. For instance, in all perfect graphs, the graph coloring problem, maximum clique problem, and maximum independent set problem can all be solved in polynomial time, despite their greater complexity for non-perfect graphs. In addition, several important minimax theorems in combinatorics, including Dilworth's theorem and Mirsky's theorem on partially ordered sets, K?nig's theorem on matchings, and the Erd?s–Szekeres theorem on monotonic sequences, can be expressed in terms of the perfection of certain associated graphs.

The perfect graph theorem states that the complement graph of a perfect graph is also perfect. The strong perfect graph theorem characterizes the perfect graphs in terms of certain forbidden induced subgraphs, leading to a polynomial time algorithm for testing whether a graph is perfect.

Cycle graph

In graph theory, a cycle graph or circular graph is a graph that consists of a single cycle, or in other words, some number of vertices (at least 3, if - In graph theory, a cycle graph or circular graph is a graph that consists of a single cycle, or in other words, some number of vertices (at least 3, if the graph is simple) connected in a closed chain. The cycle graph with n vertices is called Cn. The number of vertices in Cn equals the number of edges, and every vertex has degree 2; that is, every vertex has exactly two edges incident with it.

If

n

=

1

{\displaystyle n=1}

, it is an isolated loop.

Connectivity (graph theory)

mathematics and computer science, connectivity is one of the basic concepts of graph theory: it asks for the minimum number of elements (nodes or edges) that - In mathematics and computer science, connectivity is one of the basic concepts of graph theory: it asks for the minimum number of elements (nodes or edges) that need to be removed to separate the remaining nodes into two or more isolated subgraphs. It is closely related to the theory of network flow problems. The connectivity of a graph is an important measure of its resilience as a network.

Graph theory

computer science, graph theory is the study of graphs, which are mathematical structures used to model pairwise relations between objects. A graph in this context - In mathematics and computer science, graph theory is the study of graphs, which are mathematical structures used to model pairwise relations between objects. A graph in this context is made up of vertices (also called nodes or points) which are connected by edges (also called arcs, links or lines). A distinction is made between undirected graphs, where edges link two vertices symmetrically, and directed graphs, where edges link two vertices asymmetrically. Graphs are one of the principal objects of study in discrete mathematics.

https://eript-
dlab.ptit.edu.vn/^69989790/rfacilitateh/barousev/yqualifyx/honda+hrv+service+repair+manual.pdf
https://eript-
dlab.ptit.edu.vn/$63257483/nfacilitatek/ysuspendw/ceffectf/season+of+birth+marriage+profession+genes+are+profo
https://eript-
dlab.ptit.edu.vn/_92268748/gdescendj/dcriticiseo/sdeclinex/istanbul+1900+art+nouveau+architecture+and+interiors.
https://eript-
dlab.ptit.edu.vn/+89126016/ifacilitateq/xpronounceu/lthreatend/introduction+to+aeronautics+a+design+perspective+
https://eript-dlab.ptit.edu.vn/+37002023/mrevealw/zevaluatee/tdeclinel/wal+mart+case+study+answers.pdf
https://eript-
dlab.ptit.edu.vn/=92015042/ycontrolp/dcriticiseb/uremainv/negotiation+genius+how+to+overcome+obstacles+and+a
https://eript-
dlab.ptit.edu.vn/@25973712/lfacilitatek/jsuspendn/rqualifyw/nursing+calculations+8e+8th+eighth+edition+by+gatfc