Menger's theorems [167–169]: min-max characterizations of connectivity by number of pairwise internally-disjoint or edge-disjoint paths between pairs of vertices

Meyniel graph [330]: any graph in which every odd cycle of length at least 5 has at least two chords

Minimal imperfect graph [320]: imperfect graph where every proper induced subgraph is perfect

Minimally 2-connected [175]: deleting any edge destroys 2-connectedness

Minimum cut [178]: a source/sink cut having minimum value, or the value of such a cut

Minimum degree $\delta(G)$ [34]: minimum of the vertex degrees

Minimum (P-object) [31]: for a property P, no smaller object of the same type also has property P

Minimum Spanning Tree (MST) [95]: spanning tree with minimum sum of edge weights

Minor [251, 362]: graph (or matroid) obtained by deletions and contractions

Mixed graph: a graph model allowing directed and undirected edges

Möbius ladder: the graph obtained by adding to an even cycle the chords between vertex pairs at maximum distance on the cycle (can be drawn as a ladder with a twist)

Möbius strip: the non-orientable surface obtained by identifying two opposite sides of a rectangle using opposite orientation

Model A [430]: probability distribution generating simple graphs with vertex set $[n]$ by letting each pair be an edge with probability $p(n)$, independently

Model B [430]: probability distribution making the simple graphs with vertex set $[n]$ and m edges equally likely

rth-moment [433]: expectation of X^r

Monochromatic [386]: in a coloring, a set having all elements the same color

Monotone graph property [432]: preserved under deletion of edges or vertices

Multigraph: used by many authors to mean graphs that allow (but don't require) multiple edges and loops (some authors forbid loops from multigraphs)

Multinomial coefficient [489]: counts arrangements having fixed multiplicities of items; with k_i items of type i, there are $(\sum k_i)!/\prod(k_i!)$ ways to arrange them in a list

Multiple edges [2]: edges with the same endpoints

Nearest-insertion [497]: TSP heuristic to grow a cycle

Nearest-neighbor [496]: TSP heuristic to grow a path

Neighborhood $N(v)$ [34]: set of neighbors of v (*closed* neighborhood $N[v]$ also includes v)

Neighbors [2]: (noun) the vertices in the neighborhood; (verb) "is adjacent to"

Net outflow [178]: at a vertex, the total exiting flow minus the total entering flow

Network [176]: a directed graph with a distinguished initial vertex (source) and a distinguished terminal vertex (sink), in which each edge is assigned a flow capacity and possibly also a flow demand (lower bound)

Node: vertex, especially in network flow problems

Nondeterministic algorithm [494]: allowed to "guess" by having parallel computation paths

Nondeterministic polynomial algorithm [494]: having a polynomial-time computation path for each guess of a polynomial number of bits

Nonorientable surface: a surface with only one side

Nontrivial graph [22]: having at least one edge

Nonplanar [243]: having no embedding in the plane

Nowhere-zero k-flow [207]: a $k$flow in which all assigned weights are nonzero

NP [495]: the class of problems solvable by nondeterministic polynomial algorithms

NP-complete [495]: NP-hard and in NP

NP-hard [495]: provides a polynomial algorithm for every problem in NP

Null graph [3]: graph having no vertices

Numbering: a bijection from $V(G)$ to $[n(G)]$

Obstruction: forbidden substructure

Odd antihole [340]: complement of an odd hole

Odd component [136]: component with an odd number of vertices

Odd cycle [24]: cycle with an odd number of edges (vertices)

Odd graph: the disjointness graph of the k-subsets of $[2k + 1]$

Odd hole: chordless odd cycle

Odd vertex [27]: vertex of odd degree

Odd walk [24]: walk of odd length

Open walk [20]: walk in which the first and last vertex are different

Optimal tour: a solution to the traveling salesman problem or Chinese postman problem

Order of graph [34]: the number of vertices

Ordered graph [406]: a graph with an order relation (usually linear) on the edges

Order-preserving property [358]: for a function σ on the set of subsets of a set, the requirement that $X \subseteq Y$ implies $\sigma(X) \subseteq \sigma(Y)$

Orientable surface: a surface with two distinct sides

Orientation of graph [62]: a digraph obtained by designating a head and tail for each edge

Outdegree [58]: for a vertex, the number of edges of which it is the tail

Outerplanar graph [239]: a planar graph embeddable in the plane so that all the vertices are on the boundary of the exterior region

Outerplane graph [239]: a particular embedding of an outerplanar graph

Parallel elements [351]: non-loops in a matroid that form a set of rank 1

Parent [100]: the neighbor of a vertex along the path to the root in a rooted tree

Parity [473]: odd or even

Parity subgraph of G [312]: subgraph H such that $d_H(v) \equiv d_G(v)$ mod 2 for all $v \in V(G)$

k-partite [5]: same as k-colorable

Partite set [4]: a set in a vertex partition into independent sets (color class)

Partition matroid [357]: a matroid induced by a partition of the ground set in which a set is independent if and only if it has at most one element from each block of the partition

Partitionable graph [335]: a graph with $aw + 1$ vertices where each vertex-deleted subgraph is colorable by w stable sets of size a and coverable by a cliques of size w

Path [5]: a simple graph whose vertices can be listed so that vertices are adjacent if and only if they are consecutive in the list

u, v-path [20]: a path with u and v as endpoints

Path addition [163]: a step in an ear decomposition

Path decomposition [414]: expression of a graph as a union of pairwise edge-disjoint paths

Paw [12]: simple 4-vertex graph obtained by adding one edge to a claw

p-critical graph [334]: an imperfect graph whose proper induced subgraphs are all perfect

Pendant edge [67]: edge incident with a vertex of degree 1

Pendant vertex [67]: a vertex of degree 1

α-perfect [319]: $\alpha(H) = \theta(H)$ for evey induced subgraph H

β-perfect: [335] $\alpha(H)\omega(H) \geq n(H)$ for every induced subgraph H

γ-perfect [319]: $\chi(H) = \omega(H)$ for evey induced subgraph H

Perfect elimination ordering [224]: deletion order such that when each vertex is deleted, its neighborhood in what remains is a clique (same as *simplicial elimination ordering*)

Perfect graph [226]: graph such that $\chi(H) = \omega(H)$ for every induced subgraph H

Perfect Graph Theorem (PGT) [226, 320]: a graph is perfect if and only if its complement is perfect

Perfect order [331]: a vertex order yielding optimal greedy colorings for all subgraphs

Perfectly orderable graph [331]: having a perfect order

Perfect matching [107]: a set of edges such that each vertex belongs to exactly one of them

Peripheral vertex [70]: a vertex of maximum eccentricity

Permutation [486]: a bijection from a finite set to itself

Permutation graph: representable by a permutation σ by $v_i \leftrightarrow v_j$ if and only if σ reverses the order of i and j

Permutation matrix [120]: a 0,1-matrix having exactly one 1 in each row and column

Petersen graph [12]: the disjointness graph of the 2-sets in a 5-element set

Pigeonhole principle [491]: every set of numbers has one at least as large as the average

Pigeonhole property [427]: a finite probability space has an element where the value of a random variable is at least as large as its expectation

Planar graph [5, 235]: a graph embeddable in the plane

Plane graph [235]: a particular planar embedding of a planar graph

Plane tree [101]: tree with fixed cyclic embedding order of edges at each vertex

Planted tree [101]: rooted plane tree

Platonic solid [242]: bounded regular polyhedron

Point: vertex

Polygonal curve [234]: concatenation of segments

Polyhedron [242]: an intersection of half-spaces

Polytope: the convex hull of a set of vertices

Positional game [120]: a game in which the objective is seizing the positions of a winning set

kth-power (G^k): the graph with vertex set $V(G)$ in which $u \leftrightarrow v$ if and only if $d_G(u, v) \leq k$

Predecessor [54]: for v in a digraph, a vertex u with $u \rightarrow v$

Predecessor set [58]: for v in a digraph, the set of precedessors

Prefix-free code [101]: no code word is a prefix of another

Prim's Algorithm [104]: grows a minimum spanning tree by adding a leaf to the current tree in the cheapest way

Principal submatrix: square submatrix using rows and columns with the same indices

Product dimension [398]: minimum number of coordinate in a product representation of G

Product representation [398]: encoding of graph such that vertices are adjacent if and only if their codes differ in every coordinate

Proper coloring [192]: (1) for vertices, a coloring in which no edge is monochromatic; (2) for edges, a coloring in which edges sharing an endpoint have distinct colors

Proper subgraph of G [192]: a subgraph not equal to G

Proper subset of S [472]: a subset not equal to S

Proposal Algorithm [131]: procedure for creating a stable matching

Prüfer code [81]: for a labeled tree, a sequence of length $n - 2$ obtained by successively deleting the leaf with smallest label and recording its neighbor's label

Pseudograph: graph model that allows loops and multiple edges, used by authors who define multigraphs not to have loops

Radius [70]: the minimum of the vertex eccentricities

Ramsey number [380]: the minimum number of vertices such that assigning colors to all pairs of those vertices produces a monochromatic clique of specified size (or a specified graph) in one of the colors

Random graph [430]: a graph from a probability space, most often the space in which each labeled pair of vertices independently has probability p of adjacency; typically, $p = 1/2$ or p is a function of n

Random variable [427]: a variable that takes on a value at each point in a probability space

Rank (matroids) [349]: for a set of elements, the largest size of an independent set it contains

Reconstructible [38]: a graph determined (up to isomorphism) by the list of subgraphs obtainable by deleting a single vertex

Reconstruction Conjecture [38]: claim that all graphs with at least 3 vertices are reconstructible

Rectilinear crossing number: the minimum number of crossings in a drawing of the graph in the plane in which all edges appear as straight line segments

Reducible configuration [258]: forbidden from purported minimal 5-chromatic planar graph

Reflexive [490]: (1) a digraph with a loop at every vertex; (2) a binary relation R with $x R x$ for all x

Region [235]: for an embedding of a graph on a surface, a maximal connected subset of the surface that does not contain any part of the graph

Regular [34]: having all vertex degrees equal

Regular matroid [351]: representable over every field

k-regular [34]: having all vertex degrees equal to k

Representable matroid [351]: linear matroid

Restriction martingale [445]: martingale in which the value of successive variables is an expectation over a shrinking subset of the probability space

Rigid circuit graph: chordal graph

Robbins' Theorem [166]: every 2-edge-connected graph has a strong orientation

Root [100]: (1) a distinguished vertex; (2) in a branching, the vertex with indegree 0

Rooted plane tree [100]: a tree with a distinguished root vertex so that children of each non-leaf have a specified left-to-right ordering in the plane

Rotation scheme: a description of a 2-cell embedding; a circular permutation of the edges appearing at each vertex, giving their counter-clockwise order around the vertex

SATISFIABILITY [499]: the problem of finding truth values for variables to make a logical input formula true

Satisfiable [499]: formula having a "yes" answer in the SATISFIABILITY problem

Saturated vertex [107]: for a matching, a matched vertex

Score sequence [62]: the sequence of outdegrees in a tournament

Second moment method [433]: method for obtaining threshold functions

Self-complementary [11]: isomorphic to the complement

Self-converse: isomorphic to the converse

Self-dual: isomorphic to the dual

Semi-strong perfect graph theorem [344]: if $V(G) = V(H)$ and a set of vertices induces P_4 in G if and only if it induces P_4 in H, then G is perfect if and only if H is perfect

Semipath: an semiwalk in which each vertex appears at most once

Semiwalk: a sequence of edges (or adjacent vertices) in a directed graph such that each successive pair of edges are adjacent, without regard to the orientation of the edges

Separable: having a cut-vertex

Separating set: a vertex set whose deletion increases the number of components

k-set [380]: set of size k

Shannon Switching Game [365]: a game played on a matroid by the Spanner and the Cutter, one trying to seize a set of elements spanning a specified element, the other trying to prevent this

Shift graph [202]: graph on the 2-subsets of $[n]$ having $\{i, j\}$ adjacent to $\{j, k\}$ when $i < j < k$

Signed (di)graph: special case of weighted (di)graph, assigning $+$ or $-$ to each edge

Simple [2]: (1) a graph with no loops or multiple edges; (2) a digraph having at most one edge with each ordered pair of endpoints; (3) a matroid having no loops or parallel elements

Simplicial vertex [224]: (1) a vertex whose neighbors induce a clique

Sink [176]: a distinguished terminal vertex, or any vertex with outdegree 0

Size [35, 473]: (1) the number of edges; (2) the number of elements

Skew partition [347]: a partition X, Y of $V(G)$ such that $G[X]$ and $\overline{G}[Y]$ are disconnected

f-soluble [148]: having an edge weighting so that the sum of the weights incident to v is $f(v)$

Source [176]: a distinguished initial vertex, or any vertex with indegree 0

Source/sink cut [178]: a partition of the vertices of a network into sets S, T such that S contains the source and T contains the sink

Span function [358]: the span of a set X in a hereditary system consists of X and the elements not in X that complete circuits with subsets of X

Spanning subgraph: a subgraph containing each vertex

Spanning set [67]: a set whose span (in a hereditary system on E) is E

Spanning tree [67]: a spanning, connected, acyclic subgraph

Spectrum [453]: the list of eigenvalues with multiplicities

Split graph [345]: a graph whose vertices can be covered by a clique and an independent set

Splittance: minimum number of edges to be added or deleted to obtain a split graph

Square of a graph: the second power

Squashed-cube dimension [401]: minimum length of the vectors in a squashed cube embedding

Squashed-cube embedding [401]: encodes vertices by 0, 1, *-vectors such that distance between two vertices is the number of coordinates where one has 0 and the other has 1

Stability number [319]: independence number

Stable matching [130]: a matching having no instance of x and y each prefering the other to their current partner in the matching

r-staset [447]: stable set of size r

Stable set [3, 319]: a set of pairwise nonadjacent vertices (same as *independent set*)

Star [67]: the tree $K_{1,n-1}$ with at most one non-leaf

Star-cutset [333]: separating set inducing a subgraph having a vertex adjacent to all others

Star-cutset Lemma [334]: no p-critical graph has a star-cutset

Steinitz exchange property [358]: the property of span functions that if e is in the span of $X \cup f$ but not in the span of X, then f is in the span of $X \cup e$

Steinitz's Theorem: 3-connected planar graphs have only one embedding in the plane (more precisely, only one dual graph)

Strength [440]: of a theorem, the fraction of the time when the conclusion holds that the hypothesis also holds

Strict digraph [294]: a digraph having no loops and at most one edge with each ordered pair of endpoints

Strictly balanced: average vertex degree in subgraphs is maximized only by the full graph

Strong absorption property (matroids) [355]: if $r(X \cup e) = r(X)$ for all $e \in Y$, then $r(X \cup Y) = r(X)$

Strong component [56]: maximal strongly connected subdigraph

Strong orientation [165]: orientation of G in which each vertex is reachable from every other

Strong Perfect Graph Conjecture (SPGC) [320]: the conjecture that a graph is perfect if and only if it has no odd hole or odd antihole

Strong product $G_1 \cdot G_2$: a graph product with vertex set $V(G_1) \times V(G_2)$ and edge set $(u_1, v_1) \leftrightarrow (u_2, v_2)$ if $u_1 = u_2$ or $u_1 \leftrightarrow u_2$ and $v_1 = v_2$ or $v_1 \leftrightarrow v_2$

Strongly connected (or strong) digraph [56]: a digraph with each vertex reachable from all others

Strongly perfect [330]: a graph in which some stable set meets every maximal clique

Strongly regular [464]: a k-regular graph whose adjacent pairs have λ common neighbors, and whose nonadjacent pair have μ common neighbors

Subconstituent [470]: the subgraph induced by a vertex neighborhood or by a vertex non-neighborhood

Subdigraph [56]: a subgraph of a directed graph

Subdivision [212]: (1) the operation of replacing an edge by a path of two edges through a new vertex; (2) a graph obtained by a sequences of subdivisions

H-subdivision [212]: a graph obtained from H by subdivisions

Subgraph [5]: a graph whose vertices and edges all belong to G

Submodular function [354]: a function such that $r(X \cup Y) + r(X \cap Y) \leq r(X) + r(Y)$ for all sets X, Y

Submodularity property (matroids) [354]: having a submodular rank function

k-subset [471]: subset with k elements

Subtree representation [324]: assigns subtrees of a host tree to each vertex of a chordal graph so that vertices are adjacent if and only if the corresponding subtrees intersect

Successor [54]: for u in a digraph, a vertex v with $u \to v$

Successor set [58]: for u in a digraph, the set of successors

Sum [39]: (1) for cycles and cocycles, same as symmetric difference; (2) for a graph, the disjoint union; (3) for matroids on disjoint sets, the matroid on their union whose independent sets are all unions of an independent set from each

Supergraph of G: a graph containing G

Superregular [470]: a regular graph that is null or whose subconstituents are all superregular

Supply [184]: source constraint in a transportation network

2-switch [46]: a degree-preserving switch of two disjoint edges for two others not present

Symmetric [490]: (1) for a graph, having a non-trivial automorphism; (2) for a simple digraph, $u \to v \Leftrightarrow v \to u$; (3) for a binary relation R, $xRy \Leftrightarrow yRx$

Symmetric difference $A \triangle B$ [109, 473]: the set of elements in exactly one of A and B

System of distinct representatives (SDR) [119]: from a collection of sets, a choice of one member from each set so that all the representatives are distinct

Szekeres-Wilf Theorem [231]: $\chi(G) \leq 1 + \max_{H \subseteq G} \delta(H)$

Tail [53]: the first vertex of an edge in a digraph

Tait coloring [301]: for a planar cubic graph, a proper 3-edge-coloring

Tarry's Algorithm [95]: procedure for exploring a maze

Telegraph problem [423]: directed version of gossip problem with one-way transmissions

Telephone problem [422]: gossip problem

Tensor product: weak product

Ternary matroid [357]: representable over the field with three elements

Thickness [261]: the minimum number of planar graphs whose union is G

Threshold dimension: minimum number of threshold graphs whose union is G

Threshold function for Q [433]: a function t such that Q almost always or almost never occurs, depending on whether the parameter in the model belongs to $o(t)$ or to $\omega(t)$.

Threshold graph: having a threshold t and a vertex weighting w such that $u \not\leftrightarrow v$ iff $w(u) + w(v) \leq t$; many other characterizations, including absence of a 2-switch and existence of a construction ordering by adding isolated or dominating vertices

Topological graph theory: the study of drawings of graphs on surfaces

Toroidal [266]: graph having a 2-cell embedding on the torus

Torus [266]: the (orientable) surface with one handle

Total coloring [411]: a labeling of both the vertices and edges so that elements that are adjacent or incident receive different colors

Total Coloring Conjecture [411]: every graph G has a total coloring using at most $\Delta(G) + 2$ colors

Total domination number [117]: minimum number of vertices in a set S such that every vertex has a neighbor in S

Total interval number: minimum of the total number of intervals used to represent G as the intersection graph of unions of intervals on the real line

Totally unimodular [469]: a matrix in which all square submatrices have determinant 0 or ± 1

Toughness [288]: the minimum t such that $|S| \geq t \cdot c(G - S)$ for every separating set S, where $c(G - S)$ is the number of components of the subgraph obtained by deleting S

Tournament [61]: an orientation of the complete graph

Trace [453]: sum of the diagonal elements of a matrix

Traceable: having a Hamiltonian path

Trail [20, 59]: a walk in which no edge appears more than once

Transitive digraph [228]: $u \to v$ and $v \to w$ together imply $u \to w$

Transitive closure: (1) for a digraph D, the digraph with $u \to w$ whenever there is a path from u to w in D; (2) for a relation R, the relation S with $x S y$ whenever there is a sequence $x_0, \dots, x_k$ with $x = x_0 R x_1 R \cdots R x_k = y$

Transitivity of dependence (matroids) [359]: $e \in \sigma(X)$ and $X \subseteq \sigma(Y)$ imply $e \in \sigma(Y)$

Transportation constraints [184]: supplies and demands

Transportation Problem [185]: generalization of the assignment problem with supplies at each source and demands at each destination

Transversal [125]: a system of distinct representatives (this is the word used when the concept is generalized); also used for a system of representatives not necessarily distinct

Transversal matroid [352]: a matroid whose elements are one partite set of a bipartite graph and whose independent sets are the subsets saturated by matchings

Traveling Salesman Problem (TSP) [493]: problem of finding a minimum-weight spanning cycle

Tree [67]: a connected graph with no cycles

k-ary tree [101]: rooted tree with at most k children at each non-leaf vertex

k-tree [345]: a chordal graph obtained from a k-clique by iteratively adding a vertex whose neighborhood when added is a k-clique

Triangle [12]: a cycle of length 3

Triangle-free [41]: not having K_3 as a subgraph

Triangle inequality: $d(x, y) + d(y, z) \geq d(x, z)$

Triangular chord: chord of length two along a path or cycle

Triangulated graph [225]: a graph with no chordless cycle

Triangulation [242]: a graph embedding on a surface such that every region is a 3-gon

Trivalent: having degree 3

Trivial graph [22]: graph with no edges (some authors restrict to one vertex)

k-tuple [474]: a list of length k

Turán graph [207]: an equipartite complete multipartite graph

Turán's theorem [208]: charcterization of the complete equipartite r-partite graphs as the largest graph of a given order with no $r + 1$-clique

Tutte polynomial: a generalization of the chromatic polynomial and of other polynomials

Tutte's Theorem [146, 174, 250]: (1) for matchings, characterization of graphs with 1-factors; (2) for connectivity, characterization of 3-connected graphs by contractions to wheels; (3) for planar graphs, 3-connected planar graphs have embeddings with all bounded faces convex.

Twins [348]: vertices having the same neighborhood (false twins are adjacent vertices with the same closed neighborhoods)

Unavoidable set [258]: a collection of configurations such that every graph in a specified class contains some configuration in the collection

Underlying graph [56]: the graph obtained from a digraph by treated edges as unordered pairs

Unicyclic: having exactly one cycle

k-uniform hypergraph [449]: having only edges of size k

Uniform matroid $U_{k,n}$ [357]: matroid on $[n]$ whose independent sets are the sets of size at most k

Uniformity property (matroids) [354]: for all $X \subseteq E$, the maximal independent subsets of X have the same size

Union ($G_1 \cup G_2$) [25]: a graph whose vertex set is the union of the vertices in G_1 and G_2 and whose edge set is the union of the edges in G_1 and G_2 (written $G_1 + G_2$ if the vertex sets are disjoint)

Union of matroids [369]: the union of matroids $M_1, \ldots, M_k$ is the hereditary system whose independent sets are $\{I_1 \cup \cdots \cup I_k : I_i \in \mathbf{I}_i\}$

Unit-distance graph [201]: the graph with vertex set $\mathbb{R}^2$ in which points are adjacent if the distance between them is 1

Unlabeled graph [9]: informal term for isomorphism class

M-unsaturated [107]: vertex not belonging to an edge of M

Upper embeddable: having a 2-cell embedding on a surface of genus $\lfloor (e(G) - n(G) + 1)/2 \rfloor$

Valence: vertex degree

Value of a flow [176]: the net flow out of the source or into the sink

Variance [433]: expected squared deviation from the mean

Vectorial matroid [351]: linear matroid

Vertex [2]: element of $V(G)$, the vertex set

Vertex chromatic number [191]: chromatic number

Vertex connectivity [149]: connectivity

Vertex cover [112]: a set of vertices containing at least one endpoint of every edge

Vertex-critical: deletion of any vertex changes the parameter

Vertex cut [149, 164]: a separating set of vertices

Vertex-deleted subgraph [37]: a subgraph obtained by deleting one vertex

Vertex multiplication [320]: a replacement of vertices of G by independent sets such that copies of x and y are adjacent if and only if $xy \in E(G)$

Vertex partition: a partition of the vertex set

Vertex set $V(G)$ [2]: the set of elements on which the graph is defined

Vertex-transitive [14]: for each pair $x, y \in V(G)$, some automorphism of G maps x to y

Vizing's Theorem [275]: upper bound on edge-chromatic number in terms of maximum degree and maximum edge multiplicity

Walk [20, 59]: an alternating list of vertices and edges in a graph such that each vertex belongs to the edge before and after it (in a digraph, must follow arrows)

u, v-walk [20]: a walk from u to v.

Weak elimination property [352]: property of matrices that the union of distinct intersecting circuits contains a circuit that avoids a specified point in the intersection

Weak product $G_1 \otimes G_2$: a graph product with vertices $V(G_1) \times V(G_2)$, and edges $(u_1, v_1) \leftrightarrow (u_2, v_2)$ iff $u_1 \leftrightarrow u_2$ and $v_1 \leftrightarrow v_2$

Weakly chordal [330]: having no chordless cycle of length at least 5 in G or $\overline{G}$

Weakly connected [56]: a directed graph whose underlying graph is connected

Weight: a real number

Weighted: having an assignment of weights (to edges and/or vertices)

Well Ordering Property [19]: every nonempty set (of natural numbers) has a least element

Wheel [174]: a graph obtained by taking the join of a cycle and a single vertex

Whitney's 2-isomorphism Theorem [376]: a characterization of the pairs of graphs whose cycle matroids are isomorphic

Wiener index [72]: the sum of the pairwise distances between vertices

Zero flow: a flow in a network with flow 0 on every edge

Appendix E

Supplemental Reading

Many books have been published about graph theory. Here we list a few for the interested reader who seeks an alternative presentation or more detailed material on special topics. We list several general textbooks grouped approximately into three levels. Specialized texts and monographs follow, listed by the relevant chapter in this book. Finally, we list some books that present additional topics in graph theory.

General / elementary:

Chartrand, G. *Graphs as Mathematical Models.* Prindle–Weber–Schmidt, 1977. Reprinted as *Introductory Graph Theory*, Dover, 1985.

Clark J. and D.A. Holton, *A first look at graph theory.* World Scientific, 1991.

Trudeau R.J., *Introduction to graph theory* (originally *Dots and Lines*, 1976). Dover, 1993.

Wilson R.J. *Introduction to graph theory.* Academic Press, 1979, 1972; Longman, 1985.

Wilson R.J. and J.J. Watkins, *Graphs: An introductory approach.* John Wiley & Sons, 1990.

General / intermediate:

Bondy J.A. and U.S.R. Murty, *Graph Theory with Applications.* Elsevier, 1976.

Chartrand G. and L. Lesniak, *Graphs and Digraphs.* PWS Publishers, 1979; Wadsworth–Brooks/Cole, 1986; Chapman & Hall, 1996.

Gould R., *Graph Theory.* Benjamin/Cummings, 1988.

Gross J. and J. Yellen, *Graph Theory.* CRC Press, 1999.

Harary F., *Graph Theory.* Addison-Wesley, 1969.

Ore O., *Theory of Graphs.* AMS Colloq. **38**, Amer. Math. Soc., 1962.

General / advanced:

Berge, C. *Graphs.* North-Holland 1973, 1976, 1985. (1970, 1983 in French.)

Bollobás B., *Graph Theory: An Introductory Course.* Grad. Texts in Math. **63**; Springer-Verlag, 1979.

Bollobás B., *Modern Graph Theory.* Grad. Texts Math. **184**; Springer, 1998.

Diestel R., *Graph Theory* Grad. Texts Math. **173**; Springer-Verlag, 1996, 2000.

Zykov A.A. *Fundamentals of graph theory* Nauka, 1987 (Russian). Transl. by L. Boron, C. Christenson, and B. Smith, BCS Associates, 1990.

Chapter 1:

Asratian A.S., T.M.J. Denley, and R. Häggkvist, *Bipartite graphs and their applications.* Cambridge Tracts in Math., **131**; Cambridge Univ. Press, 1998.

Fleischner H., *Eulerian Graphs and Related Topics*, Vols 1 & 2. Ann. Discrete Math. **45 & 50**, North-Holland, 1990 & 1991.

Harary F., R.Z. Norman, and D. Cartwright, *Structural Models: An Introduction to the Theory of Directed Graphs.* John Wiley & Sons, 1965.

Chapter 2:

Buckley F. and F. Harary, *Distance in Graphs.* Addison-Wesley, 1990

Moon J., *Counting Labelled Trees.* Canadian Math. Congress, 1970.

Chapter 3:

Gusfield D. and R.W. Irving, *The Stable Marriage Problem: Structure and Algorithms.* MIT Press, 1989.

Haynes T.W., S.T. Hedetniemi, and P.J. Slater, *Fundamentals of Domination in Graphs.* Pure and Applied Math. **208**; Marcel Dekker, 1998.

Lovász L. and M.D. Plummer, *Matching Theory.* North-Holland, 1986.

Chapter 4:

Ahuja R.K., T.L. Magnanti, and J. Orlin, *Network Flows.* Prentice-Hall, 1993.

Ford L.R. and D.R. Fulkerson, *Flows in Networks.* Princeton Univ. Press, 1962.

Tutte W.T., Connectivity in Graphs. Univ. Toronto Press, 1966.

Chapter 5:

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