DISCRETE MATHEMATICAL PROBLEMS WITH MEDICAL APPLICATIONS pdf

1: Discrete mathematics - Wikipedia

The study of discrete mathematics and optimization with medical applications is emerging as an important new research area. Significant applications have been found in medical research, for example in radiosurgical treatment planning, virtual endoscopy, and more.

Kenneth Appel and Wolfgang Haken proved this in In graph theory, much research was motivated by attempts to prove the four color theorem , first stated in , but not proved until by Kenneth Appel and Wolfgang Haken, using substantial computer assistance. In , Yuri Matiyasevich proved that this could not be done. The Cold War meant that cryptography remained important, with fundamental advances such as public-key cryptography being developed in the following decades. Operations research remained important as a tool in business and project management, with the critical path method being developed in the s. The telecommunication industry has also motivated advances in discrete mathematics, particularly in graph theory and information theory. Formal verification of statements in logic has been necessary for software development of safety-critical systems , and advances in automated theorem proving have been driven by this need. Computational geometry has been an important part of the computer graphics incorporated into modern video games and computer-aided design tools. Several fields of discrete mathematics, particularly theoretical computer science, graph theory, and combinatorics , are important in addressing the challenging bioinformatics problems associated with understanding the tree of life. Theoretical computer science includes areas of discrete mathematics relevant to computing. It draws heavily on graph theory and mathematical logic. Included within theoretical computer science is the study of algorithms for computing mathematical results. Computability studies what can be computed in principle, and has close ties to logic, while complexity studies the time, space, and other resources taken by computations. Automata theory and formal language theory are closely related to computability. Petri nets and process algebras are used to model computer systems, and methods from discrete mathematics are used in analyzing VLSI electronic circuits. Computational geometry applies algorithms to geometrical problems, while computer image analysis applies them to representations of images. Theoretical computer science also includes the study of various continuous computational topics. Information theory The ASCII codes for the word "Wikipedia", given here in binary , provide a way of representing the word in information theory , as well as for information-processing algorithms. Information theory involves the quantification of information. Closely related is coding theory which is used to design efficient and reliable data transmission and storage methods. Information theory also includes continuous topics such as: Mathematical logic Logic is the study of the principles of valid reasoning and inference , as well as of consistency , soundness , and completeness. For classical logic, it can be easily verified with a truth table. The study of mathematical proof is particularly important in logic, and has applications to automated theorem proving and formal verification of software. Logical formulas are discrete structures, as are proofs , which form finite trees [13] or, more generally, directed acyclic graph structures [14] [15] with each inference step combining one or more premise branches to give a single conclusion. The truth values of logical formulas usually form a finite set, generally restricted to two values: Concepts such as infinite proof trees or infinite derivation trees have also been studied, [16] e. Partially ordered sets and sets with other relations have applications in several areas. In discrete mathematics, countable sets including finite sets are the main focus. Indeed, contemporary work in descriptive set theory makes extensive use of traditional continuous mathematics. Combinatorics Combinatorics studies the way in which discrete structures can be combined or arranged. Enumerative combinatorics concentrates on counting the number of certain combinatorial objects - e. Analytic combinatorics concerns the enumeration i. In contrast with enumerative combinatorics which uses explicit combinatorial formulae and generating functions to describe the results, analytic combinatorics aims at obtaining asymptotic formulae. Design theory is a study of combinatorial designs , which are collections of subsets with certain intersection properties. Partition theory studies various enumeration and asymptotic

problems related to integer partitions , and is closely related to q-series , special functions and orthogonal polynomials. Originally a part of number theory and analysis , partition theory is now considered a part of combinatorics or an independent field. Order theory is the study of partially ordered sets , both finite and infinite.

2: Discrete Mathematics and Its Applications

Discrete Mathematical Problems with Medical Applications by Panos M. Pardalos, , available at Book Depository with free delivery worldwide.

3: Discrete Mathematical Problems with Medical Applications : Ding-Zhu Du :

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4: Discrete Mathematical Problems with Medical Applications

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Discrete Mathematical Problems With Medical Applications: Dimacs Workshop Discrete Mathematical Problems With Medical Applications, December ,

6: dblp: Discrete Mathematical Problems with Medical Applications

While discrete tomography has a mathematical theory based mostly on discrete mathematics (in particular on combinatorial and discrete geometry) and has interesting theoretical problems concerning.

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