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Title

Abstract

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Abstract

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Title
From Bertrand's Postulate to Hamilton Cycles

Abstract
A consequence of Bertrand's postulate, proved by L. Greenfield and S. Greenfield in 1998, assures that the set of integers {1, 2, ..., 2n} can be partitioned into pairs so that the sum of each pair is a prime number for any positive integer n. Cutting through it from the angle of Graph Theory, we provide new insights into the problem and conjecture a stronger statement that the set of integers {1, 2, ..., 2n} can be rearranged into a cycle so that the sum of any two adjacent integers is a prime number. In this talk, I will introduce our result and something interesting.

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Title
A Light-weight Bit Commitment Protocol Based on Unpredictable Channel Noise

Abstract
Bit commitment is an important tool in the design of many secure cryptographic protocols, such as coin flipping, zero-knowledge proof, and secure computation. In this talk, we present a computationally light-weight bit commitment protocol over a noisy channel. For the security of the proposed protocol, we show that the receiver has almost no information about the committer's secret due to unpredictability of the noises in the communication channel. Hence, the security of our bit commitment protocol does not depend on hard problems; it is information-theoretically secure. Furthermore, the protocol needs only exclusive-or operations. Thus, it is computationally light-weight, and it can be used in the devices whose computing resources are limited.

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Title

Abstract

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Title
n-fold L(2,1)-labeling of Cartesian product of graphs

Abstract

For two sets of nonnegative integers A and B, the *distance* between these two sets, denoted by $d(A,B)$, is defined by $d(A,B) = \min\{|a-b| : a \in A, b \in B\}$. For a positive integer n, we use S_n to denote the set $\{X : X \subseteq \mathbb{N} \cup \{0\}, |X| = n\}$. Given a graph G and positive integers n, p and q, an *n-fold $L(p,q)$-labeling* of G is a function $f : V(G) \to S_n$ satisfies $d(f(u), f(v)) \geq p$ if $d_G(u,v) = 1$, and $d(f(u), f(v)) \geq q$ if $d_G(u,v) = 2$. An *n-fold k-$L(p,q)$-labeling* f of G is an n-fold $L(p,q)$-labeling of G with the property that $\max\{a : a \in \bigcup_{v \in V(G)} f(u)\} \leq k$. The smallest number k such that G has an n-fold k-$L(p,q)$-labeling is called the *n-fold $L(p,q)$-labeling number* of G and is denoted by $\lambda^n_{p,q}(G)$. Note that when $n = 1$, the n-fold $L(p,q)$-labeling problem is just the $L(p,q)$-labeling problem, hence this problem can be viewed as a generalization of the $L(p,q)$-labeling problem. In this talk, some results concerning the n-fold $L(2,1)$-labeling number of Cartesian product of paths and cycles, will be given.

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Title
On the distance matrices of the CP graphs

Abstract

In 1971, Graham and Pollak introduced an addressing scheme for communication where each vertex of a graph G is labeled with a string in $\{1, 0, *\}$ such that the distance of every pair of vertices is the same as the Hamming distance of their labels. Let $N(G)$ be the minimum length of a such string. It was shown that $\max\{n_+, n_-\} \leq N(G) \leq n-1$, where (n_+, n_-, n_0) is the inertia of the distance matrix $\mathcal{D}(G)$ of G and $n = |V(G)|$. To study the inertia, the distance determinant $\det(\mathcal{D}(G))$ were computed for several families of graphs, and they found that the distance determinant of a tree only depends on its order n, but not the structure.

In this talk, we will introduce another family of graphs such that the distance determinant is independent of the structure. For these graphs, we show that $n_- = n - 1$, which meets the upper bound.

Joint work with Yen-Jen Cheng (National National Chiao Tung University).

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Title
Recent progress on equiangular lines

Abstract
A set of lines is call equiangular lines if each pair of lines forms the same angle. An interesting question on this topics is to determine maximum size of equiangular lines in any n-dimensional Euclidean space. We will talk about recent progress on this question. Especially, we offer partial solutions for Lemmens-Seidel conjecture which was announced in 1973. This is the joint work with Yen-Chi Roger Lin.

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Title

Abstract