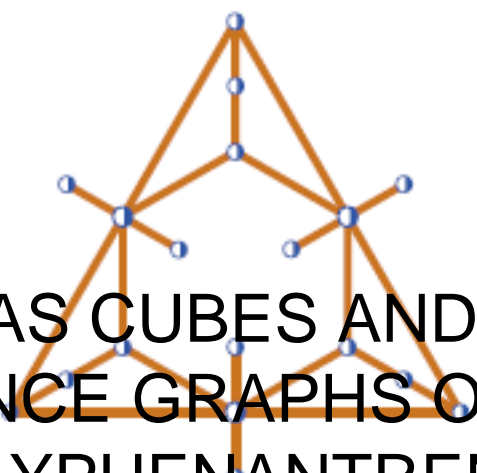


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LUCAS CUBES AND THE RESONANCE GRAPHS OF CYCLIC POLYPHENANTRENES

Content :

Several classes of graphs based on Fibonacci strings were introduced in the last 10 years as models for interconnection networks, among them Lucas cubes. The vertex set of a Lucas cube Λ_n is the set of all binary strings of length n without consecutive 1's and 1 in the first and the last bit. Two vertices of a Lucas cube are adjacent if their strings differ in exactly one bit.

Carbon nanotubes were discovered 20 years ago and their unique structure explains their unusual properties such as conductivity and strength. Our interest is in a class of carbon nanotubes, called cyclic polyphenantrenes. The resonance graph of an aromatic hydrocarbon reflects the structure of its perfect matchings (i.e. Kekulé structures).

The main result of this paper is the following: Lucas cubes are the nontrivial component of the resonance graphs of cyclic polyphenantrenes. This result has some interesting applications regarding hamiltonicity and a median property of the resonance graph of a cyclic polyphenantrene.

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