DECOMPOSITION OF THE PRODUCT OF CYCLES
BASED ON DEGREE PARTITION

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Abstract

The Cartesian product of \( n \) cycles is a \( 2n \)-regular, \( 2n \)-connected and bipancyclic graph. Let \( G \) be the Cartesian product of \( n \) even cycles and let
\[ 2n = n_1 + n_2 + \cdots + n_k \]
with \( k \geq 2 \) and \( n_i \geq 2 \) for each \( i \). We prove that if \( k = 2 \), then \( G \) can be decomposed into two spanning subgraphs \( G_1 \) and \( G_2 \) such that each \( G_i \) is \( n_i \)-regular, \( n_i \)-connected, and bipancyclic or nearly bipancyclic. For \( k > 2 \), we establish that if all \( n_i \) in the partition of \( 2n \) are even, then \( G \) can be decomposed into \( k \) spanning subgraphs \( G_1, G_2, \ldots, G_k \) such that each \( G_i \) is \( n_i \)-regular and \( n_i \)-connected. These results are analogous to the corresponding results for hypercubes.

Keywords: hypercube, Cartesian product, \( n \)-connected, regular, bipancyclic, spanning subgraph.

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References

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