Some graph properties of the optimised degree six 3-modified chordal ring network

ABSTRACT

The interconnection topology of a parallel or distributed network is pivotal in ensuring good system performance. It can be modelled by a graph, where its edges represent the links between processor nodes represented by vertices. One such graph model that has gained attention by researchers since its founding is the chordal ring, based on an undirected circulant graph. This paper discusses the degree six 3-modified chordal ring, CHR6o3, and presents its graph theoretical properties of symmetry and Hamiltonicity. CHR6o3 is shown to be asymmetric, and can be decomposed into similar subgraphs, each consisting of only one type of node in its class if ring links are ignored. These properties aid both the development of a routing scheme and also determining lower bounds for its chromatic number. Conditions for the existence of a Hamiltonian Circuit within CHR6o3 are also discussed. The existence of a Hamiltonian Circuit within a network simplifies parallel processing as the processors can be arranged to work on a task in a linear array. An Eulerian Circuit was shown to exist in CHR6o3. The existence of an Eulerian Circuit plays a role in routing in optical networks.

Keyword: Parallel processing; Modified chordal rings; Asymmetry; Hamiltonicity; Eulerity