Talk Math 2 Me

Edges, and Vertices, and Paths! Oh, my!
Hamiltonicity of Unbalanced Tripartite Graphs

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Abstract

There's no graph like a Hamiltonian graph! A graph with a path that travels through every vertex exactly once and returns to the starting vertex is a Hamiltonian graph. In 1952, Dirac proved that for a graph to be Hamiltonian, it is sufficient that every vertex neighbors more than half of the remaining vertices. This result paved the way for the study of hamiltonicity in graphs.

Graphs whose vertices can be split into sets so that no edge joins two vertices in the same set are multipartite graphs. A tripartite graph is a multipartite graph in which the vertices are partitioned into three independent sets. A multipartite graph is balanced if all sets have an equal number of vertices, and otherwise, it is unbalanced. Improvements of Dirac's result are known in balanced multipartite graphs, but there aren't results known for unbalanced multipartite graphs. We focus our attention on unbalanced tripartite graphs.

In this work, we extend and improve previously known results and present several sufficient conditions for determining hamiltonicity of unbalanced tripartite graphs. Hamiltonicity of tripartite graphs has many applications such as optimizing neural networks, enhancing municipal services, configuring data systems and computer network topology.

This seminar is sponsored in part by Pi Mu Epsilon and the Texas State University Department of Mathematics. For more information or to sign up to speak, contact Ellen Robinson at ebr21@txstate.edu.