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

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Abstract of Poster Presentation: Theres 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 a graph is Hamiltonian if any vertex is of degree at least $\frac{n}{2}$. This result paved the way for the study of hamiltonicity in graphs.
A tripartite graph is a graph in which the vertices are partitioned into three independent sets so that no edge joins two vertices in the same set. A tripartite 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 arent results known for unbalanced multipartite graphs. This paper focuses on unbalanced tripartite graphs.
In this work, we extend and improve previously known results for hamiltonicity and present several new 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, computer network topology and many more.

[Joint work with Hannah Brown, Elizabeth Wrightsman, John Rayha, Juan Aguilar] Received: July 20, 2018