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EXTRACTION OF NON-HAMILTONIAN WEIGHTED DIRECTED GRAPHS FROM A HAMILTONIAN WEIGHTED DIRECTED GRAPH

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Abstract

This paper investigates the Shortest Spanning Directed Cycle (SSDC) and Minimal Feedback Edge Set (MFES), using sign incidence matrix and siphon-trap matrix of Petri Net (PN) model of, Hamiltonian Weighted Directed Graph (HWDG) respectively. Using the siphon-trap and bounded ness property of Petri Net, we develop algorithms for finding a shortest spanning directed cycle and minimal feed-back edge set in Hamiltonian weighted directed graph. Minimum Feedback Edge Set (MFES) is obtained form siphon-trap matrix by operating boolean addition on elements of its columns, which gives a minimal set of places. These places are neither siphon nor trap, and removal of corresponding edges from HWDG ensures that, the resulting graph is non-Hamiltonian.

Key Words: Hamiltonian Weighted Directed Graph, Shortest Spanning Directed Cycle, Minimum Feedback Edge Set, Petri Net, Siphon, Trap, Sign incidence matrix, Siphon-Trap matrix.

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