

## 2D Structured Non-Cyclic Fuzzy Graphs

**Authors :** T. Pathinathan, M. Peter

**Abstract :** Fuzzy graphs incorporate concepts from graph theory with fuzzy principles. In this paper, we make a study on the properties of fuzzy graphs which are non-cyclic and are of two-dimensional in structure. In particular, this paper presents 2D structure or the structure of double layer for a non-cyclic fuzzy graph whose underlying crisp graph is non-cyclic. In any graph structure, introducing 2D structure may lead to an inherent cycle. We propose relevant conditions for 2D structured non-cyclic fuzzy graphs. These conditions are extended even to fuzzy graphs of the 3D structure. General theoretical properties that are studied for any fuzzy graph are verified to 2D structured or double layered fuzzy graphs. Concepts like Order, Degree, Strong and Size for a fuzzy graph are studied for 2D structured or double layered non-cyclic fuzzy graphs. Using different types of fuzzy graphs, the proposed concepts relating to 2D structured fuzzy graphs are verified.

**Keywords :** double layered fuzzy graph, double layered non-cyclic fuzzy graph, order, degree and size

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