

Quantum-treesoft set and quantum-forestsoft set

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Abstract. Fuzzy Sets [17, 44], Neutrosophic Sets [30], and Plithogenic Sets [33] provide powerful frameworks for modeling uncertainty across diverse domains. The Soft Set, introduced by Molodtsov [22], associates each parameter with a subset of a universe, enabling flexible approximations. Building on this idea, researchers have developed Fuzzy Soft Sets [16], Neutrosophic Soft Sets [15], HyperSoft and SuperHyperSoft Sets [34, 35], TreeSoft Sets [37], ForestSoft Sets [20], and GraphicSoft Sets [7].

A TreeSoft Set arranges parameters in a hierarchical tree, while a ForestSoft Set unites multiple tree mappings under one framework. Separately, the Quantum-Soft Set [18] represents each parameter as a normalized quantum superposition, encoding membership through amplitude coefficients and measurement probabilities. In this paper, we introduce Quantum TreeSoft Sets and Quantum ForestSoft Sets, which integrate hierarchical and forest-structured Soft Sets with the quantum superposition paradigm. These new constructs aim to enrich the theoretical foundations and practical applications of Soft Set Theory at the intersection with quantum information science.

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