

RELIABILITY ANALYSIS OF FRACTAL WATER DISTRIBUTION NETWORKS BASED ON BASIC PATTERNS

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Abstract. Fractals are spatial objects whose geometric properties include irregularity, scale dependence, and self-similarity. It has been reported that the urban system and its subsystems e.g. transportation networks could be characterized by fractal properties. Being part of the whole urban system, water distribution networks (WDNs) evolve to adapt the water demand of the population in a fractal-sprawled urban form, which makes the WDNs inheriting the fractal structure. We would apply fractal geometry to generate simulated WDNs based on several basic patterns with different level of reliability. Then the relationship between the reliability of basic patterns and the whole generated networks would be investigated. Due to the self-similarity property of the simulated WDNs, it is expected that the reliability of the whole network would be consistent with the basic patterns composing it.