

Automated Organization of Hierarchical Catchments in River Network Based Constrained Delaunay Triangulation

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ABSTRACT

Catchments of river networks are fundamental to the automation of flow-routing management in distributed hydrologic models and for the morphometric evaluation of river network structure.

Catchments ordering also act as a very important factor for the generalization. Each river network has an intrinsic hierarchical structure that can be described by various stream ordering procedures. River network can be schematized as sets of basic unit: links (river segments) and nodes (source nodes, outlet nodes and junction nodes). An algorithm is proposed for automated organization of hierarchical catchments from a database based on classification of river and constrained Delaunay triangulation network in this paper.

The proposed algorithm uses the strategy from highest order link to lowest links to construct the catchments of river networks. At first the river network will be ordered by Horton's classification. Then triangulation network of this ordered river network will be constructed. The river links will be constrained edges in the triangulation network. The hull of this triangulation network will act as the catchments area of the highest order link. The other catchments areas of all other links of each order in the river network will be constructed from higher order to lower order based on relations among links, skeleton lines between links, boundaries of catchments at higher order and the properties of triangles. The triangles in the triangulation network can be classified into several types based on their properties. These different types of triangles play an important role in analysis and building hierarchical catchments of river network. The algorithm has been tested in a test dataset.

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TS3.8 Spatial Information Based Services

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