
Estimating Flow Distribution over Digital Elevation Models Using a Form-Based Algorithm

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Abstract

This paper discusses a new approach to estimate flow distribution over a continuous surface. This approach is based on the analysis of topographic form of a surface facet that dictates the flow distribution. In the case of a raster Digital Elevation Model (DEM), the facet consists of a centre cell and its eight neighbouring cells. If the form of the facet is convex, the water flow is divergent; thus the amount of flow is distributed to all cells that have a lower elevation. In the case of a concave or flat surface, the convergent flow is directed to the main drainage direction. Comparison between the results of this algorithm with the traditional 'eight-move' algorithm, which is widely used in today's commercial GIS software, indicated that the form-based algorithm yielded a more realistic results in estimating flow accumulation over the land surface, but produced less convincing results in deriving a drainage network.
