
P-simple sets and equivalent deletion rules

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Abstract

This talk is inspired by the notion of a P-simple set proposed by Bertrand [1] and the 3D parallel 6-subiteration surface-thinning algorithm reported by Gong and Bertrand [2]. A reduction transforms a binary picture only by changing some black points to white ones, which is referred to as deletion. Sequential reductions traverse the black points of a picture, and consider a single point for possible deletion, while parallel reductions can delete a set of black points simultaneously. Two reductions are called equivalent if they produce the same result for each input picture. A deletion rule is said to be equivalent if it provides a pair of equivalent parallel and sequential reductions.

The author introduced a special class of deletion rules: A deletion rule is said to be general-simple if it deletes only simple points, and the deletability of any point does not depend on the 'color' of any deletable point [3]. He showed that a deletion rule is equivalent, and provides topology-preserving reductions if it is general-simple [3].

We are to discuss the relationship between P-simple sets and general-simple deletion rules:

- Reductions with general-simple deletion rules delete P-simple sets [4].
- For each P-simple set Q in a picture, there is a general-simple deletion rule that deletes Q from this picture [4].

In addition, we are to report that the deletion rule of the parallel thinning algorithm proposed by Gong and Bertrand is general-simple [5]. Hence, it deletes P-simple sets, and it is equivalent to a sequential algorithm with the same deletion rule.

References

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Cybernetica 23, 939-958, 2018.

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