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I/O-efficient dynamic planar point location. (English) [Zbl 1056.68062](#)

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Summary: We present an I/O-efficient dynamic data structure for point location in a general planar subdivision. Our structure uses $O(N/B)$ disk blocks of size B to store a subdivision of size N . Queries can be answered in $O(\log_B^2 N)$ I/Os in the worst case, and insertions and deletions can be performed in $O(\log_B^2 N)$ and $O(\log_B N)$ I/Os amortized, respectively.

Part of our data structure is based on an external version of the so-called logarithmic method that allows for efficient dynamization of static external-memory data structures with certain characteristics. Another important part of our structure is an external data structure for vertical ray-shooting among line segments in the plane with endpoints on $\sqrt{B} + 1$ vertical lines, developed using an external version of dynamic fractional cascading. We believe that these methods could prove helpful in the development of other dynamic external memory data structures.

MSC:

68P05 Data structures

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Keywords:

dynamic data structure; logarithmic method

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