

Matricial Model for the Range Query Problem and Lower Bounds on Complexity

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Let V be an array. The range query problem concerns the design of data structures for implementing the following operations. The operation $Update(j, x)$ has the effect $V[i] \leftarrow V[i] + x$, and the query operation $Retrieve(i, j)$ returns the partial sum $\sum_{k=i}^j v_k$. These tasks are to be performed on-line. We define an algebraic model-based on the use of matrices-for the study of the problem. In this paper we establish as well a lower bound for the sum of the average complexity of both kinds of operations.