Local Computation Algorithms

Ronitt Rubinfeld

MIT, Cambridge, MA, USA; and
Tel Aviv University, Tel Aviv, Israel
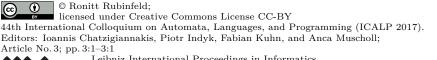`ronitt@csail.mit.edu`

──── **Abstract** ────

Consider a setting in which inputs to and outputs from a computational problem are so large, that there is not time to read them in their entirety. However, if one is only interested in small parts of the output at any given time, is it really necessary to solve the entire computational problem? Is it even necessary to view the whole input? We survey recent work in the model of *local computation algorithms* which for a given input, supports queries by a user to values of specified bits of a legal output. The goal is to design local computation algorithms in such a way that very little of the input needs to be seen in order to determine the value of any single bit of the output. In this talk, we describe results on a variety of problems for which sublinear time and space local computation algorithms have been developed – we will give special focus to finding maximal independent sets and sparse spanning graphs.