

Towards a study of low-complexity graphs*

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Abstract

We propose the study of graphs that are defined by low-complexity distributed and deterministic agents. We suggest that this viewpoint may help introduce the element of *individual choice* in models of large-scale social networks. This view point may also provide interesting new classes of graphs for which to design algorithms.

We focus largely on the case where the “low complexity” computation is AC^0 . We show that this is already a rich class of graphs that includes examples of lossless expanders and power-law graphs. We give evidence that even such low-complexity graphs present a formidable challenge to algorithms designers. On the positive side, we show that many algorithms from property testing and data sketching can be adapted to give meaningful results for low-complexity grap