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Complexity of maximum and minimum fixed point problem in Boolean networks

Abstract:

Given a fixed integer k, the maximum (minimum) fixed point problem is the following: given a signed graph G, is there a Boolean network with at least (most) k fixed points and with G as interaction graph? Firstly, we prove that the maximum fixed point problem is NP-complet if k>1 and polynomial otherwise. Secondly, we prove that the minimum fixed point problem is NEXPTIME-complet for every k. We also present complexity results when k is a part of the input.