1012-68-195 **Dace Ruklisa*** (`dace.ruklisa@mii.lu.lv`), Rainis boulevard 29, LV-1459 Riga, Latvia. *Analysis of properties of Finite State Linear Model.* Preliminary report.

Various mathematical models describing gene regulatory networks have been a subject of intense studies during the recent years.

Here we consider Finite State Linear Model (FSLM) that is used to describe gene networks. We solve several theoretical properties of FSLM that previously were left unsolved. These properties might help to better understand the biological significance of this model.

Our main result is theorem, which states that for a given network N with a given initial state the vertex reachability problem is undecidable. This implies that for a given network and its initial state the problem to decide whether it is periodic is algorithmically unsolvable. As a corollary we prove that the problem to decide whether two networks are equivalent is algorithmically unsolvable. Also, the problem to decide whether for two networks with given initial states there exists time moment t such that networks are not behaviourally t-equivalent is algorithmically unsolvable.

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