Models of natural computation : gene assembly and membrane systems

Brijder, R.

Stellingen

Propositions belonging to the thesis

Models of Natural Computation:
Gene Assembly and Membrane Systems

by Robert Brijder

1. Although the definition of reduction graph appeared later than the definition of string pointer rules, the string pointer rules are (implicitly) designed to respect the reduction graph and its reduction function. [this thesis]

2. The reason that the string pointer rules and their dual rules are similar is because they both rely (explicitly or not) on the flip operation and both require that the obtained result is linear. [this thesis]

3. While often it can be quite straightforward to construct membrane systems to simulate a given model of computation, it can be quite challenging to provide "elegant" constructions. [this thesis]

4. The notion of maximal parallelism provides a powerful synchronization mechanism that is largely responsible for the computational power of membrane systems. [this thesis]

5. A numerical self-assembly membrane system with communication generates only star graphs. [F. Bernardini, R. Brijder, G. Rozenberg, and C. Zandron, *Multiset-Based Self-Assembly of Graphs*, Fundamenta Informaticae, v. 75, 49-75, 2007]

6. Every perfectly quilted rectangular snake (PQRS) picture language can be defined by Wang tiles. [R. Brijder and H.J. Hoogeboom, *Perfectly Quilted Rectangular Snake Tilings*, to appear in Theoretical Computer Science]

7. Natural computation and theoretical computer science profit from each other. While on one hand theoretical computer science concepts are often useful for natural computation, on the other hand natural computation research often provides novel motivations, concepts, and research directions for fundamental theoretical studies.

8. The most interesting models of natural computation are those that combine biological motivation with mathematical elegance.

9. Although not always popular among students, theoretical computer science should form a substantial part of university computer science curricula.