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SMALLEST FILTERS IN COMPLETE OBLIGATORY HYBRID NETWORKS OF EVOLUTIONARY PROCESSORS [1]

Artiom Alhazov

Institute of Mathematics and Computer Science, Academy of Sciences of Moldova
Str. Academiei 5, Chişinău MD-2028, Moldova
e-mail: artiom@math.md

Gemma Bel-Enguix

Laboratoire d'Informatique Fondamentale, Aix-Marseille University
163 Avenue de Luminy, F-13288 Marseille
e-mail: gemma.belenguix@gmail.com

and

Yurii Rogozhin

Institute of Mathematics and Computer Science, Academy of Sciences of Moldova
Str. Academiei 5, Chişinău MD-2028, Moldova

ABSTRACT

We take a recently introduced model of obligatory hybrid networks of evolutionary processors (OHNEPs), and consider the case of a complete underlying graph and the nodes having only one operation per node. A HNEP is a distributed parallel string processing system, where each node may be equipped with some elementary operations (one-symbol insertion, deletion or substitution), a condition where to apply it, and finite alphabets called filters, controlling passage of strings between the nodes, depending on presence or absence of the corresponding symbols. The word obligatory means the unevolved strings do not persist in the system. In this paper we present an unexpected optimal result: OHNEPs with total complexity of filters (the *sum* of sizes of permitting input, forbidden input, permitting output and forbidden output contexts) per node not exceeding 1 are computationally complete. Thus, we completely solve an open problem about minimal total complexity of input and output filters per node in computationally complete OHNEPs. The result is also valid for the (non-obligatory) HNEPs.

Keywords: networks of evolutionary processors, size of filters

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