

ON THE EXISTENCE OF CODINGS BETWEEN TRACE MONOIDS ¹

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ABSTRACT

In this paper, we tackle the still open problem of the decidability of the existence of a coding F between two trace monoids M_1, M_2 , when M_1 is a free product of free commutative monoids. We prove that a coding morphism always exists between M_1 and M_2 for particular trace monoids M_2 .

Keywords: codings, trace monoids, trace codings.

1. Introduction

The principal new products of the fifth computer generation could be personal portable computing devices and parallel processors. Motivated by technology, proposals for possible theoretical models for parallel processing have been made. Among them, in [21], MAZURKIEWICZ proposed the *trace monoids*, already introduced by CARTIER and FOATA in a combinatorial context [6]. Trace monoids were also considered as a new algebraic framework in which one can extend classical results of the free monoid theory (see the surveys [7, 11, 14, 12, 15, 24]). This latter aspect will be considered here.

In particular, in this paper we consider *codings on traces* which are defined as injective morphisms from one trace monoid into another [8, 23]. This notion is the natural extension of the algebraic notion of coding on words, i. e., an injective morphism between two free monoids, which was introduced by SCHÜTZENBERGER [26] (see [2] for a systematic exposition on the theory of variable-length codes or codings).

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