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MAXIMAL ERROR-DETECTING CAPABILITIES OF FORMAL LANGUAGES [1]

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ABSTRACT

A (combinatorial) channel is a set of pairs of words describing all the possible input-output channel situations. We introduce the concept "maximal error-detecting capability" of a given language, with respect to a certain class of channels, which is simply a maximal channel for which the given language is error-detecting. The new concept is intended to address formally the question of "finding the largest amount of errors that a language can detect". We focus on rational channels (those described by finite transducers) and on regular languages, and consider the problem of computing maximal error-detecting capabilities of a given regular language for various classes of rational channels. We also discuss briefly the concept "maximal error-correcting capability" of a formal language.

Keywords: Algorithm, automaton, channel, error detection, maximal, regular language

1. Introduction

A (combinatorial) channel is a set of pairs of words describing all the possible input-output situations permitted by the channel. The fact that the pair (w, z) is in the channel means that the word z can be received via the channel when the word w is used as input. In this case, if $w \neq z$ then we say that z contains errors, or that w was

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