

DESCRIPTIONAL COMPLEXITY OF ERROR/EDIT SYSTEMS^{1 2}

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ABSTRACT

Errors appear in a wide range of information processing and transmission applications, such as data communications, biological computing, computer typesetting, speech recognition, etc. It can be said indeed that errors are truly natural phenomena. In this work we introduce error or edit systems (e-systems, for short), which are formal languages over the alphabet of the basic edit operations. Our formalism allows one to model essentially any kind of error situations. For certain natural regular e-systems, we investigate their descriptonal complexity in terms of the number of states of the automata accepting such systems. This problem is of interest in its own right as well as in the computation of maximal error-correcting capabilities of known languages.

Keywords: Error models, automata, descriptonal complexity, formal languages

The capacity to blunder slightly is the real marvel of DNA. Without this attribute we still would be anaerobic bacteria and there would be no music.

(Lewis Thomas, 'The medusa and the snail')

1. Introduction

Errors appear in a wide range of information processing and transmission applications, such as data communications [11], biological computing [14, 5, 6], computer typesetting [10], speech recognition [1], etc. It can be said indeed that errors are

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