ENUMERATION OF SOME CLASSES OF WORDS AVOIDING TWO GENERALIZED PATTERNS OF LENGTH THREE [1]

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ABSTRACT

The method we have applied in [4] to count pattern avoiding permutations is adapted to words. As an application, we enumerate several classes of words simultaneously avoiding two generalized patterns of length 3.

Keywords: Enumeration, word, generalized pattern avoidance, generating function, ECO method

1. Introduction

The present work falls into the wide research area of *combinatorics of words* (see, for instance, [13] for a comprehensive treatment of many topics in this field). More specifically, we deal with some enumerative aspects of pattern avoidance on words. This topic has first appeared in [17], and has been systematically developed by Burstein in [5]. Subsequently several authors have studied this kind of matters, and in particular in [6] exact formulas and/or generating functions for the number of words avoiding a single generalized pattern of length 3 have been found. Very recently, in [12] these results have been further extended, by determining all the Wilf-equivalence classes of word patterns of length at most 6, and in [10] an algorithm, called *scanning element algorithm*, has been developed as a general technique to deal with enumeration problems concerning restricted classes of words. Here we use a general method to count words on a totally ordered alphabet avoiding a set of generalized patterns of length 3 of type $(1, 2)$ (i.e., having a dash between the first and the second element). Our approach consists of inserting a letter at the end of a given word of length n, thus obtaining a word of length $n+1$. We perform this operation in such a way that part of the preceding letters may have to be renamed. The choice of the letter to be inserted depends on the patterns to be excluded. Obviously, the above mentioned insertion technique, if applied to a word avoiding the requested patterns, produces words in

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