

## ON THE RECOGNIZABILITY OF RIGHT COMPLETE CODES

R. D. GIRI

*A-128, Aakar Nagar, Katol Road, Nagpur-440013, India*  
*e-mail: rdgiri39@yahoo.in*

### ABSTRACT

A code or a language  $X$  is recognizable if and only if it can be presented by a regular expression. Alternatively  $X$  is recognizable if the family of sets  $u^{-1}X$  is finite. It is natural to ask which codes are recognizable, and conversely which recognizable sets are codes. In this paper, we partially answer the first part of the problem for right complete codes.

*Keywords:* recognizability of codes, right complete codes, semaphore codes

*Dedicated to Motupalli Satyanarayana*

### 1. Introduction and Preliminaries

A code is recognizable if and only if it can be presented by a regular expression, i. e., using the operation union, product and Kleene star. Recognizability of a language is the most important and most investigated aspect to be studied in theoretical computer science. It is natural to ask which codes are recognizable, and conversely which recognizable sets are codes. We discuss the first part of the problem for the class of right complete codes.

A word is a finite concatenation of letters, words are also called messages. A word without any letter is called an empty word denoted by 1. The set of all words including the empty word under concatenation of words is free monoid  $A^*$  over an alphabet  $A$ . However  $A^+ = A^* - \{1\}$  is the semigroup of words. Let  $|v|$  denote the length of a word  $v \in A^+$ .

Any proper subset of  $A^+$  is called a language. For a language  $X$  and a word  $w$ ,  $w$  is called an  $X$ -word, if it belongs to  $X$ .

We frequently use notations  $P_X$ ,  $L_X$ , and  $R_X$  for the set of all left factors of  $X$ , the set of all proper left factors of  $X$ , and the set of all proper right factors of  $X$ , respectively.

A language  $X$  is called a code if a message over  $X$  is unique.

We presume in our text that no code  $X$  is equal to its alphabet. We recall some relevant definitions from [1] and [5] so that the text remains self contained.