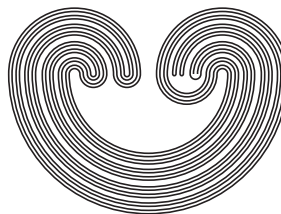


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## A GAME DIMENSION FUNCTION

by

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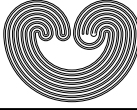
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## A GAME DIMENSION FUNCTION

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**ABSTRACT.** We define a topological *game dimension*, ( $gd$ ), such that  $gd(X) = Ind(X)$  where  $X$  is a hereditarily normal space and  $Ind(X) \leq gd(X)$  where  $X$  is a normal space. We ask a question which is about whether  $gd(X) = Ind(X)$  where  $X$  is a normal space. By making some appropriate modifications in this game, the dimension functions  $Ind$  and  $ind$  can be characterized in the realm of normal spaces.

### 1. INTRODUCTION

Dimension theory (see [4]) and topological games (see [6] or [1]) are interesting and important topics in general topology. Some relations between topological games and dimension of spaces are discussed in [2] and [3] in the realm of separable metrizable spaces and topological groups. In this paper, by defining a topological game, we characterize the dimension function  $Ind$  for hereditarily normal spaces. One can improve this game and characterize the dimension function  $Ind$  and  $ind$  for normal spaces.

The dimension functions  $Ind$ ,  $ind$ , and  $dim$  are basic tools for dimension theory. It is known that for any normal space  $X$ ,  $dim X \leq n \geq 0$  if and only if for every finite sequence  $((A_0, B_0), (A_1, B_1), \dots, (A_n, B_n))$  of  $n + 1$  pairs disjoint closed subsets of  $X$  there exist  $L_0, L_1, \dots, L_n$  such that  $L_0 \cap L_1 \cap \dots \cap L_n = \emptyset$  and  $L_i$  is a partition between  $A_i$  and  $B_i$  (Theorem 3.2.6 [4]). We consider the case where the pairs are given and the partitions are chosen in turn. Let us clear that. Suppose  $dim X = 1$ ; then we know that for any  $((A_0, B_0), (A_1, B_1))$  pairs of closed disjoint subsets, there exist partitions  $L_0$  and  $L_1$  such that  $L_0 \cap L_1 = \emptyset$ . Now, let us be given  $(A_0, B_0)$  and we have to choose an  $L_0$  (without seeing  $(A_1, B_1)$ ).

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