# A CLASS OF NONSPLITTABLE LINKS

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## 1. INTRODUCTION

In [2] and [4] it is shown that the link $L_0 = L_{01} \cup L_{02} \subset S^3 = \text{Bd}\, I^4$ (illustrated in Figure 1) does not bound disjoint smooth disks in the 4-cell $I^4$. To prove this, it is shown that the Arf invariant $\phi$ is not linear on $L_{01} \cup L_{02}$; that is,

$$\phi(L_{01} \cup L_{02}) \neq \phi(L_{01}) + \phi(L_{02}) \quad \text{Mod } 2\,.$$

In this paper we study the question of whether or not $\phi$ is linear on a given link. We are then able to determine, in Corollary 1 of Theorem 1, a class of nonsplittable links (links which do not bound disjoint planar surfaces in $I^4$) by showing that $\phi$ is not linear on each member of the class (the link $L_{01} \cup L_{02}$ is the prototype of our class).

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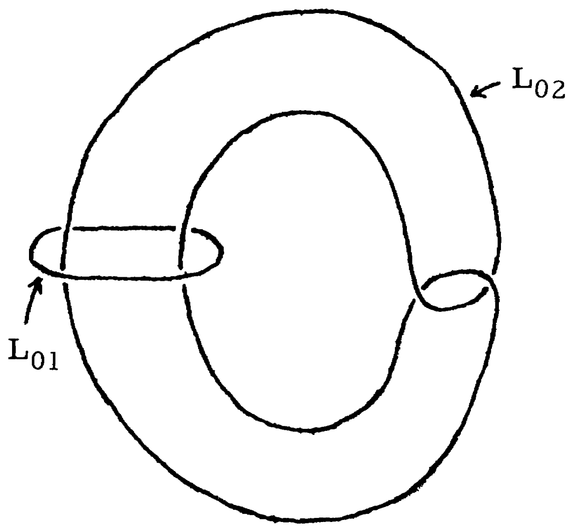


Figure 1.

## 2. THE *-OPERATION AND BRIDGE EQUIVALENCE

In this paper we assume all spaces and maps are piecewise linear. We call $X = \bigcup_{i=1}^{n} X_i$ a *link* if each $X_i = \bigcup_{j=1}^{n(i)} x_{ij}$, where each $x_{ij}$ is an oriented simple closed curve in $S^3$, $x_{ij} \cap x_{ij'} = \emptyset$, $j \neq j'$, and $X_i \cap X_j = \emptyset$, $i \neq j$. We call the

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