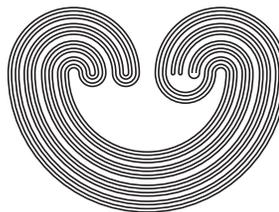


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THE ONLY KNOT CONSTRUCTIBLE AS A MAHAVIER PRODUCT IS THE UNKNOT

by

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MICHAEL LOCKYER

ABSTRACT. Mahavier products can be considered as finite approximations of the inverse limits of set-valued functions. Unlike the inverse limits of single-valued continuous functions, interesting structures can occur after finitely many iterations in the set-valued case. These structures are called Mahavier products.

A general question in the study of the inverse limits of set-valued functions is whether a given continuum can be the Mahavier product of bonding spaces defined on a particular factor space, usually $[0, 1]$. In this paper we show that with the assumption of piecewise linear bonding spaces, the only knot obtainable as a Mahavier product on $[0, 1]$ is the unknot.

1. INTRODUCTION

Mahavier products originate from the study of inverse limits of set-valued functions. In contrast to inverse limits of single-valued continuous functions, when using set-valued functions interesting non-trivial structures can appear before reaching the “limit,” i.e., after finitely many steps. These finite approximations of inverse limits of set-valued functions are called *Mahavier products* (they will be defined more rigorously in §2).

One of the general problems in the study of inverse limits of set-valued functions is whether a given continuum can be obtained as the inverse limit of set-valued functions on $[0, 1]$ (either with a single bonding function or allowing for different bonding functions). These are Problem 6.57 and Problem 6.59 in [4]. Some examples of results relating to these problems are in [3], where Alejandro Illanes shows that the circle is not obtainable

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