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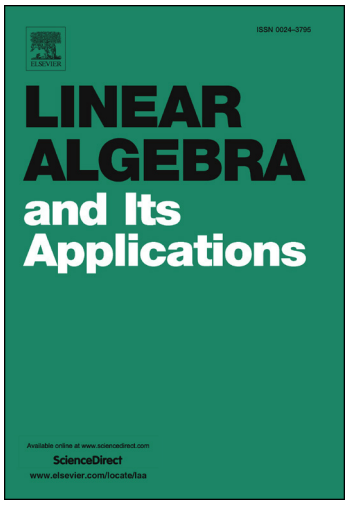

On a Theorem by Hopf

José Antonio Cuenca Mira, Francisca Miguel García

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On a Theorem by Hopf

José Antonio Cuenca Mira*

Departamento de Álgebra, Geometría y Topología.
Facultad de Ciencias, Universidad de Málaga.
29071 Málaga, Spain.
E-mail: cuenra@uma.es

and

Francisca Miguel García†

Departamento de Economía Aplicada (Matemáticas),
Facultad de Ciencias Económicas, Universidad de Málaga.
29071 Málaga, Spain.
E-mail: fcamiguel@uma.es

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Abstract

We prove that the commutative nearly absolute valued division algebras have dimension ≤ 2. This extends a well-known theorem by H. Hopf asserting the same property for each commutative real division algebra of finite dimension. As an application we prove that $\mathbb{R}$, $\mathbb{C}$ and $\overset{\star}{\mathbb{C}}$ are the unique commutative real nearly absolute valued division algebras with norm satisfying $\|x^2\| = \|x\|^2$.

AMS Subject Classification: 17A35, 15A99, 46H70.
Keywords: division algebra, commutative algebra, nearly absolute valued algebra, absolute valued algebra.

0 Introduction

Nearly absolute valued algebras have been introduced in [13] (see also [3] for a more complete information, which includes a quick review in pp. 281-283).

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