J. of Ramanujan Society of Mathematics and Mathematical Sciences
Vol. 13, No. 1 (2025), pp. 91-96

DOI: 10.56827/JRSMMS.2025.1301.5 **ISSN (Online): 2582-5461**

ISSN (Print): 2319-1023

CHARACTERIZATION OF IDEMPOTENCY IN POWER-ASSOCIATIVE RINGS

M. Aristidou and G. Chailos*

American University of Cyprus
Larnaca, CYPRUS

E-mail : michael.aristidou@aucy.ac.cy

*Department of Computer Science,
University of Nicosia, CYPRUS

E-mail : chailos.g@unic.ac.cy

(**Received:** *Jul. 06, 2025* **Accepted:** *Dec. 01, 2025* **Published:** *Dec. 30, 2025)*

Abstract: In this paper, we extend Mosic's result for idempotency in associative rings to power-associative rings. We provide a necessary and sufficient condition for idempotency and give some examples.

Keywords and Phrases: Ring, power-associative, idempotent.

2020 Mathematics Subject Classification: Primary 17A01, 17C27, Secondary 20H25, 15A30.

1. Introduction

In this article we provide a necessary and sufficient condition for idempotency in power-associative rings, hence extending Mosic's result in [5]. Mosic gives the relation between idempotent and tripotent elements in an associative ring R, generalizing the result on matrices by Trenkler and Baksalary [8]. Namely, for any $x \in R$, where 2, 3 are invertible, x is idempotent if and only if x is tripotent and $1 - x$ is tripotent or $1 + x$ is invertible.

In [1], we pointed out that even though $\mathbb{O}/\mathbb{Z}_p$[1,2] is not associative, the result does hold in some cases. For example, consider the tripotent $x = 4 + 3e_1 + e_2 + 4e_3$ in $\mathbb{O}/\mathbb{Z}_7$, which is also an idempotent. It is not hard to check this directly or using