

# A Note on Orthodox Additive Inverse Semirings

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## Abstract

We show in an additive inverse regular semiring  $(S, +, \cdot)$  with  $E^\bullet(S)$  as the set of all multiplicative idempotents and  $E^+(S)$  as the set of all additive idempotents, the following conditions are equivalent:

- (i) For all  $e, f \in E^\bullet(S)$ ,  $ef \in E^+(S)$  implies  $fe \in E^+(S)$ .
- (ii)  $(S, \cdot)$  is orthodox.
- (iii)  $(S, \cdot)$  is a semilattice of groups.

This result generalizes the corresponding result of regular ring.

**Key words:** Additive inverse semirings, regular semirings, orthodox semirings.

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## 1 Introduction

A semiring  $(S, +, \cdot)$  is a nonempty set  $S$  on which operations of addition,  $+$ , and multiplication,  $\cdot$ , have been defined such that the following conditions are satisfied:

- (1)  $(S, +)$  is a semigroup.
- (2)  $(S, \cdot)$  is a semigroup.
- (3) Multiplication distributes over addition from either side.