

WHEN THE UNIVERSAL INVERSE SEMIGROUP  $Pr(S)$  OF  
INVERSE SEMIGROUP  $S$  IS  $E^*$ -UNITARY

Sahar Moayeri Rahni<sup>1</sup>

<sup>1</sup> Shiraz University, Shiraz, Iran

MSC 2000: 20M18, 16W22

## Abstract

In this work, we will consider the notion of *partial actions* of groups and *partial actions* of inverse semigroups on sets, for more details about these concepts the reader is referred to [1, 3]. At first, for a finite group  $G$  we will prove that if the order of  $G$  is greater than one then  $G$  admits a partial action which is not a homomorphism. We will prove our claim by using the *universal inverse semigroup*  $S(G)$  associated to a group  $G$ , more information can be found in [3].

Also, we will consider the *universal inverse semigroup*  $Pr(S)$  that A. Buss and R. Exel in [3] associated to an inverse semigroup  $S$ . Recall that an inverse semigroup  $S$  is  $E^*$ -unitary if for  $s \in S$  and  $e \in E(S)$ ,  $e \leq s$  implies that  $s \in E(S)$ . We will show that an inverse semigroup  $S$  is  $E^*$ -unitary if and only if  $E(S)$ , the set of all idempotents, is a filter. Our main Theorem for an inverse semigroup  $S$  is that:

**Theorem.** An inverse semigroup  $S$  is  $E^*$ -unitary if and only if  $Pr(S)$  is  $E^*$ -unitary inverse semigroup.

**Keywords:** Partial action, Universal inverse semigroup,  $E^*$ -Unitary inverse semigroup.

## References

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- [3] R. Exel, *Partial actions of groups and actions of inverse semigroups*, J. Proc. Amer. Math. Soc., 126 (1998), pp. 3481–3494.

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<sup>1</sup>e-mail: smoayeri@shirazu.ac.ir