

**NATIONAL SYMPOSIUM ON  
MATHEMATICAL METHODS AND APPLICATIONS**

22<sup>nd</sup> December 2004

Indian Institute of Technology, Madras  
Chennai, TN  
India

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**Smarandache Double Cosets  
in a S-semigroup**

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**Abstract:**

In 1998 Padilla Raul and S. Florentine introduced some new concepts on Smarandache Algebraic structures. The study of Smarandache semigroups (S-semigroups) has been extensively studied in the year 2002. In this paper we introduce and study the notion of Smarandache Double Cosets in a S-semigroup. We prove Smarandache Double coset relation in a S-semigroup  $S$  in general is not an equivalence relation on  $S$  in contrast with the fact that the double coset relation on a group  $G$  is an equivalence relation. We introduce the notion of Smarandache equivalence relation (S-equivalence relation) on S-semigroup  $S$  and prove S-equivalence relation is an equivalence relation on  $S$  but an equivalence relation on  $S$  is not in general a S-equivalence relation on  $S$ .

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