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A STUDY ON G-SETS

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Abstract. This paper concerns the study of G-sets and their basic properties.

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1. Introduction

The idea of groups with operators has been discussed in [2]. This idea leads to a generalization in the form of sets with operators. In the group theory this concept is known as G-sets. In this paper, we obtain some basic properties of G-sets.

2. Preliminaries

Definition 2.1. Let G be a group, X be a set and $\phi : G \times X \to X$ be a mapping. Then, the pair (X, ϕ) is called a G-set (or a set with operator G), if for all $g_1, g_2 \in G$ and $x \in X$, the following conditions are satisfied:

(i) $\phi(g_1 g_2, x) = \phi(g_1, \phi(g_2, x))$,

(ii) $\phi(e, x) = x$,

where e is the identity of G.

For the sake of convenience, one can denote $\phi(g, x)$ as gx. Under this notation, above conditions become

(i) $(g_1 g_2)x = g_1(g_2 x)$,

(ii) $ex = x$.

3. Results on G-Sets

Theorem 3.1. Every normal subgroup H of a group G is a G-set under the mapping $\phi : G \times H \to H$ defined by $\phi(a, h) = aha^{-1}$ for every $a \in G$ and $h \in H$.