

### The Definitions and Some Elementary Properties of Polygroup

Thushanthan R.<sup>1</sup>, Sangathan M.<sup>1</sup>


#### Abstract

The polygroup concept has found applications in many branches of mathematics such as analysis, algebra, geometry and fuzzy sets. The notion of quasi-canonical hypergroup called polygroup, which is a generalization of the notion of a group. A hyper-structure admits more than one output under the operation, which is called a hyper-operation. We generalize the notion of polygroup structure induced by the double cosets, which is also a generalization of the group object. There are only a few studies that have developed polygroup under hyper-operation. In our previous work, some of its properties such as normal subpolygroups, maximal subpolygroups and chain conditions were proved. In this paper, we construct a new polygroup from a given polygroup. Also, we show that if  $G$ ,  $K$  and  $H$  are polygroups, then  $G/H/K/H \cong G/K$  which is induced by the double cosets of a group.

**Keywords:** Double cosets, isomorphic, polygroup structure

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<sup>1</sup> Department of Interdisciplinary Studies, Faculty of Engineering, University of Jaffna, Sri Lanka

 Corresponding Author: rajathusha01@gmail.com