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## A NOTE ON DIGITAL SEQUENCE HYPERGRAPHS AND 2-GRAPH CONGRUENCE ARITHMETIC

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**Abstract:** In this paper we present some aspects of hypergraphs, related to digital arithmetic. It leads us to the notion of digital infinite sequence hyperedges on finite decimal digits vertex sets which responsively exposes hypergraphic presentation of division algorithm leading to most common notion of Greatest Common Divisor. The notion of so-called digital hyperstar reveals some interesting phenomena of hypergraphic approach of division algorithm, in particular, the remainder and dividend petals invariant property together with hypergraphic illustrative approach of Euclidean algorithm. Finally, the paper discusses as a particular case of hypergraph viz. 2-graph exposure of congruence arithmetic using the operations addition and multiplication separately giving rise to similar pattern of complete directed graphs of four vertices using two arcs. Also the same concept leads to the notion of incidence matrix giving weightage on the resultant sum of weights on arcs leading to an induced complete directed graph etc. together with the cancellation property of congruence relation.

**Keywords and Phrases:** Hypergraph, Digital sequence, Division Algorithm, Hyperstar, Congruence modulo.

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### 1. Introduction

In many computer applications, division is less frequently used than the other three operations. As a result, some microprocessors designed for digital signal processing (DSP) or embedded processor applications do not have a divide instruction.