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**Ryan K Therkelsen\*** ([rtherke@ncsu.edu](mailto:rtherke@ncsu.edu)), North Carolina State University, Department of Mathematics, Box 8205, Raleigh, NC 27695-8205. *An introduction to (coloured) constant composition designs.*

A  $(v, k, r)$ -design is a collection of  $k$ -element subsets (blocks) of a  $v$ -element set  $X$ , such that every element of  $X$  is contained in exactly  $r$  blocks. Such objects are often represented by a  $(0, 1)$ -incidence matrix. We introduce a new notion of design, called “ $k$ -coloured constant composition” designs. These designs are a class of multi-set designs satisfying the additional property that the set of all rows, and the set of all columns, of the corresponding incidence matrix are of constant composition. We establish the necessary and sufficient existence conditions on the parameters of a constant composition 1-design and follow with algebraic and geometric examples. In particular, we show that for certain ring-linear codes, minimum (homogeneous) weight codewords induce constant composition designs. We also show how projective geometries over finite rings can yield constant composition designs. (Received February 06, 2009)