## Covering Arrays - Part II

(Org: **Lucia Moura** (University of Ottawa) and/et **Brett Stevens** (Carleton University))

---

**ANDRÉ CASTOLDI**, Universidade Tecnológica Federal do Paraná, Brazil

*Bounds on Covering Codes in Rosenbloom-Tsfasman Spaces using Ordered Covering Arrays*

Let $K_q^{RT}(m,s,R)$ be the smallest cardinality of a $q$-ary code of length $ms$ and covering radius $R$ with respect to the Rosenbloom-Tsfasman metric. The case $s=1$ corresponds to the classical covering codes in Hamming spaces. The research problem concerning covering codes is to improve lower and upper bounds for $K_q^{RT}(m,s,R)$. Ordered covering arrays (OCAs) are a generalization of ordered orthogonal arrays and covering arrays. OCAs have been introduced more recently by Tamar Krikorian. In this talk, I will present results improving the upper bound on covering codes using ordered covering arrays.

---

**ANANT GODBOLE**, East Tennessee State University, USA

*Covering Arrays for Some Equivalence Classes of Words*

We study two variations of the covering array scheme in which all words are not considered to be different. In the first, partitioning hash families, words are equivalent if they induce the same partition of a $t$ element set. In the second, words of the same weight are equivalent. In both we produce logarithmic upper bounds on the minimum size $k=k(n)$ of a covering array. Definitive results for $t=2,3,4$, as well as general results, are provided.

---

**MUHAMMAD JAVED**, Ryerson University

*Sequence Covering Arrays*

In some processes, if certain $t$-subsets of events do not occur in the correct order, then this can cause unpredictable behaviours and misleading results. In a test suite, each occurrence of $t$ events must be tested in every possible ordering. Such a test suite is equivalent to a sequence covering array, SeqCA$(N;t,k,v,\lambda)$, a set of $N$ $k$-sequences on $v$ events ($k \leq v$) for which every subsequence of $t$ events ($t \leq k$) appears in at least $\lambda$ of the sequences. We will discuss some recent existence results for the case $t=2$. Joint work with Andrea Burgess and Peter Danziger.

---

**LUCIA MOURA**, University of Ottawa

*Getting hyper with covering arrays*

Covering arrays meet graphs and hypergraphs in different ways. Covering arrays on graphs and variable-strength covering arrays use a graph (or hypergraph) with vertices corresponding to columns and edges specifying where coverage is required. Graph-dependent covering arrays use the previous column graph plus an alphabet graph with vertices corresponding to symbols and edges indicating which pairs of symbols need to be covered at all. Covering arrays avoiding forbidden edges (CAFEs) make us hyperactive with graphs dictating forbidden combinations of symbols in specific pairs of columns. We survey various joint works with Danziger, Maltais, Meagher, Mendelsohn, Newman, Raaphorst, Stevens and Zekaoui.