Designs and Codes II

(Org: **Peter Dukes** (University of Victoria))

PETER DUKES, University of Victoria
Injection Codes

An n-ary *injection code* of length m and minimum distance d is a set Γ of injections from an m-set (of positions) into an n-set (of symbols) such that any two different words in Γ have Hamming distance $\geq d$. When $n = m$, an injection code becomes a *permutation code*. And when Γ meets a certain upper bound, it becomes an *ordered design*.

This talk will survey my preliminary observations on injection codes.

HADI KHARAGHANI, University of Lethbridge
The Gramian of mutually unbiased Hadamard matrices

Two Hadamard matrices H and K of order n are called *unbiased* if the absolute value of all the entries of HK^t equal $\sqrt{n}$. The Gramian of any ordered set of mutually unbiased Hadamard matrices contains very interesting configurations including some 3-class symmetric association schemes. We will concentrate on the case where $n = 4^n$ for this talk.

ESTHER LAMKEN, San Francisco
Existence results for Howell cubes

In this talk, I will describe some new existence results for Howell cubes of even order. We construct Howell cubes, $H_3(2n, 2n+\alpha)$, for $\alpha = 2, 4, 6$. I will also describe related results for 3 dimensional frames which are used in our constructions. This is joint work with Jeff Dinitz and Greg Warrington.

DAVID PIKE, Memorial University of Newfoundland
Hamilton cycles in restricted block-intersection graphs

Given a BIBD(v, k, λ) with block set $\mathcal{B}$, its i-block-intersection graph is the graph having vertex set $\mathcal{B}$ such that two vertices B_1 and B_2 are adjacent if and only if $|B_1 \cap B_2| = i$. It has been known since 1999 that the 1-block-intersection graph of any λ-fold triple system on $v \geq 12$ points is Hamiltonian. We now consider restricted block-intersection graphs of BIBDs with larger block sizes.

ALEX ROSA, McMaster University
Circulants as signatures of cyclic Steiner triple systems

With each cyclic Steiner triple system we associate a certain set of circulants called its *signatures*. From among the set of all circulants of appropriate degree, a circulant is a signature if it is a signature of some cyclic Steiner triple system; otherwise, it is a nonsignature. We show the existence of nonsignatures, and discuss questions related to the enumeration of signatures and nonsignatures. (Joint work with Mariusz Meszka.)