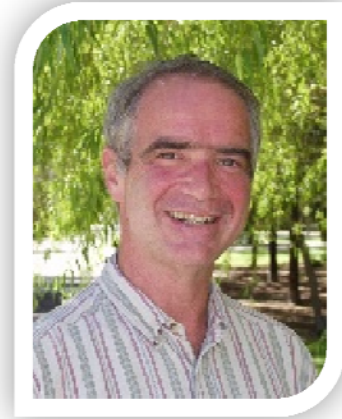


Covering Arrays and Perfect Hash Families

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Venue: SPMS-Executive Classroom 1, MAS-03-06
School of Physical and Mathematical Sciences

A covering array on an alphabet of size v is an N by k array with each cell containing an entry from the alphabet. It has strength t if, whenever you choose t columns, and choose one of the v alphabet symbols for each column, there is at least one row of the array in which we find the prescribed symbols in the chosen columns. These combinatorial arrays have arisen in testing computer hardware and software, and generally in locating faults that result from component interactions. The explicit construction of covering arrays with “few” rows for given t , k , and v is a challenging problem. In this talk, we describe a strategy that employs the structure of the finite fields in two ways. First a covering array is constructed directly using the algebra of the field. Then a related object, a perfect hash family, is constructed from the field and used to inflate the number of columns of the covering array. We use this construction to explore a number of questions about the structure of arrays arising from the finite fields.

Speaker Biography

Charlie Colbourn is Professor of Computer Science and Engineering at Arizona State University in Tempe. He has authored about three hundred refereed journal papers and three books and has graduated 18 Ph.D. students. Colbourn’s research employs combinatorial mathematics and algorithms to address problems in diverse areas including software testing, networking (optical, wireless, wireline), computational molecular biology, communications and information theory and experimental design.

Host: Prof. Chee Yeow Meng, Division of Mathematical Sciences, School of Physical and Mathematical Sciences

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