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## Mutually orthogonal latin squares: Packing and covering analogues

*Charles Colbourn*

Arizona State University, USA

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Starting with Euler, the existence of sets of mutually orthogonal latin squares has been a fascinating study with connections to algebra, finite geometry, combinatorial designs, number theory, and applications in communications, statistical design, networking, coding theory, and computation. Still the existence questions remain far from being settled! Recently many applications have surfaced in which one wants a good “approximation” to a set of MOLS. A number of these relax the requirements on the squares, and require that when two squares are superimposed either every pair appears at least once (covering) or at most once (packing).

After a quick tour of what is known about MOLS, we explore two problems involving a covering analogue and a packing analogue. The covering variant arises in a combinatorial object called a covering array, while the packing variant arises in a construction of perfect hash families. We describe the connections with MOLS, and discuss some challenging open questions.