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Intersections of Latin Squares

If we superimpose two latin squares on the same symbols and count the number of agreements, this is the *intersection number* of the pair. Here, we consider the problem of determining which intersection numbers are possible, given the order of the squares. Early considerations solved this problem when the two squares have the same order, say n. Roughly speaking, the result is that every value in $[0, n^2]$ is possible, except for a few values near the top of the interval. Here, we consider and completely solve the following two parameter version of the problem. *For fixed m and n, $n < m$, what are the realizable intersection numbers for two latin squares, one of order m and the other of order n?* This is joint work with Jared Howell.