

An Evans-style result for block designs

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A now-proven conjecture of Evans states that any partial latin square with at most $n - 1$ filled cells can be completed to a latin square. This is sharp: there are uncompletable partial latin squares with n filled cells. This talk will discuss the analogous problem for block designs.

An $(n, k, 1)$ -*design* is a collection of k -subsets (*blocks*) of a set of n *points* such that each pair of points occur together in exactly one block. If this restriction is relaxed to require only that each pair of points occur together in at most one block we instead have a *partial* $(n, k, 1)$ -*design*. I will outline a proof that any partial $(n, k, 1)$ -design with at most $\frac{n-1}{k-1} - k + 1$ blocks is completable to a $(n, k, 1)$ -design provided that n is sufficiently large and obeys the obvious necessary conditions for an $(n, k, 1)$ -design to exist. This result is sharp for all k . I will also mention some related results concerning edge decompositions of almost complete graphs into copies of K_k .