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Strongly regular graphs satisfying the 4-vertex condition

A graph satisfies the 3-vertex condition if and only if it is strongly regular. A graph of order v satisfies the v-vertex condition if and only if it is rank 3, so the most symmetric kind of strongly regular graph. We show that the family of strongly regular graphs $NO_n^\varepsilon(q)$, defined on the non-zero square points of a non-degenerate quadric with two points adjacent if they span a tangent, satisfies the 4-vertex condition. These graphs have rank $(q+3)/2$. We also discuss some other families of strongly regular graphs satisfying the 4-vertex condition.

Joint work with A. E. Brouwer.