Strongly Regular Graphs From Large Arcs in Affine Planes

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In 1968, Tits constructed generalized quadrangles from ovals in Desarguesian planes; in 1969 and 1971, Ahrens-Szekeres and Hall constructed generalized quadrangles from hyperovals in Desarguesian planes. Similarly, in 1972 and 1985, Payne constructed generalized quadrangles from q-arcs in Desarguesian planes. All of these quadrangles give strongly regular graphs. Removing the assumption that the plane must be Desarguesian, we construct strongly regular graphs from k-arcs in affine planes of order q with $k = q + 2, q + 1, q$. In addition, strongly regular graphs are constructed from maximal arcs of degree n in affine planes of order q.

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