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Duelling dragons

This project investigates 3-class Q -antipodal association schemes and related objects. Van Dam proved in 1999 that 3-class Q -antipodal association schemes are equivalent to the linked systems of symmetric designs of Cameron (1972). Kodalen constructed new examples in 2019, exhibiting connections to equiangular lines and real mutually unbiased bases. The dual object, at the parameter level, is a 3-class P -antipodal association scheme; such graphs are known as distance-regular antipodal covers of complete graphs, or DRACKNs. In the special case where the automorphism group contains an abelian subgroup acting regularly on the vertices, we have an explicit duality via character theory and then we are truly challenging DRACKNs to have duals. As we will explain in this talk, this is rare.