

On antipodal distance-regular covers of complete graphs related to  
finite 2-transitive simple groups

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Antipodal distance-transitive covers of complete graphs were classified by C.D. Godsil, R.A. Liebler and C.E. Praeger. A more general problem is to describe all arc-transitive antipodal distance-regular covers of complete graphs.

In this talk, we will present three new infinite families of arc-transitive distance-regular graphs related to groups  $Sz(q)$ ,  $U_3(q)$  and  ${}^2G_2(q)$ . They are antipodal  $r$ -covers of complete graphs on  $q^2 + 1$ ,  $q^3 + 1$  or  $q^3 + 1$  vertices respectively with  $\lambda = \mu$  and  $r > 1$  being an arbitrary odd divisor of  $q - 1$ . We will also provide several constructions of these graphs, considering the internal structure of their automorphism groups.