

New series of strongly regular graphs

Mikhail Muzychuk, Netanya Academic College, Israel

In 1971 W.D. Wallis proposed a new construction of strongly regular graphs based on an affine design and a Steiner 2-design. Thirty years later D.G. Fon-Der-Flaass found how to introduce a sort of randomness into Wallis construction. He built a hyperexponentially many strongly regular graphs with the same parameters, but his construction covered only one case of Wallis construction, namely when the corresponding Steiner design has block size 2. The goal of this talk is twofold. First, I show how to modify Fon-Der-Flaass ideas in order to cover all the cases of Wallis construction. Second, it will be shown that a Steiner 2-design in the original Wallis construction may be replaced by a partial linear space with some additional properties. As a result new constructions of strongly regular graphs will be presented.