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Einladung zu einem Vortrag  
im Rahmen des DK-Seminars des Karl Popper Kollegs von

Prof. Edwin van Dam  
(Tilburg University, Netherlands)  
zum Thema

**Eigenvalues and distance-regularity of graphs**

Ort: I.2.01 der Universität Klagenfurt

Zeit: Montag 23. April 2018, um 15:00 c.t.

*Kurzfassung:*

The eigenvalues of the adjacency matrix of a graph contain a lot --- but not always all -- information on the structure of the graph. In this talk, we will dive deeper into graphs that have a lot of combinatorial symmetry: distance-regular graphs (such as Hamming graphs and Johnson graphs). We will give an overview of when distance-regularity is determined by the eigenvalues (and when it is not). We will see how systems of orthogonal polynomials can help to recognize distance-regular graphs from their eigenvalues and a little extra information through the 'spectral excess theorem'. We then discuss how these methods and ideas led to the construction of the twisted Grassmann graphs, a family of distance-regular graphs that have the same spectrum as certain Grassmann graphs.

These twisted graphs are currently the only known family of distance-regular graphs with unbounded diameter that are not vertex-transitive. If time permits, we also present some other results, such as a characterization of the generalized odd graphs ('the odd-girth theorem'), and discuss some results on graphs that are 'almost distance-regular', in particular how the latter can be used to construct non-isomorphic graphs with the same eigenvalues.

Das Institut für Mathematik freut sich auf Ihren Besuch.

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