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(terwilli@math.wisc.edu), Department of Mathematics, Van Vleck Hall, University of Wisconsin-Madison, 480 Lincoln Drive, Madison, WI 53706. Distance-regular graphs with tails. Preliminary report.

Let Γ be a distance-regular graph with valency $k \geq 3$ and diameter $d \geq 2$. It is well-known that the Schur product $E \circ F$ of any two minimal idempotents of Γ is a linear combination of minimal idempotents of Γ . Situations where there is a small number of minimal idempotents in the above linear combination can be very interesting. In the case when E = F, the rank one minimal idempotent E_0 is always present in this linear combination and can be the only one only if $E = E_0$ or $E = E_d$ and Γ is bipartite. We study the case when $E \circ E \in \text{span}\{E_0, E, H\}$ for some minimal idempotent H of Γ . We call a minimal idempotent E with this property a *tail*. If Γ is Q-polynomial wrt E, then E is a tail. Let θ be an eigenvalue of Γ with multiplicity m > 1. We show that

$$m(a_1 - k - k\omega) \left(\omega - \frac{k\omega^2 - a_1\omega - 1}{k - a_1 - 1} \right) \leq k(a_1^* - m - m\omega) \left(\omega - \frac{m\omega^2 - a_1^*\omega - 1}{m - a_1^* - 1} \right)$$

where $\omega = \theta/k$ and $a_1^* = q_{ii}^i$ if $\theta = \theta_i$. Let *E* be the minimal idempotent corresponding to θ . The equality case is equivalent to *E* being a tail. Further characterizations of the case when *E* is a tail are given. (Received February 28, 2009)