

Lutz Hille

Tilting modules, fans and group actions with a dense orbits

TIME:

25 Jun 2007, 16:00 - 18:00

LOCATION:

To any finite dimensional algebra A of finite global dimension we associate a fan in the Grothendieck group of the category of finite dimensional A -modules. We prove several properties of this fan, in particular it is smooth and purely t -dimensional, where t is the rank of the Grothendieck group. Moreover, the cones of maximal dimension correspond to tilting modules of projective dimension at most one. As a first application we consider certain actions of algebraic groups related to the category of A -modules. Then it turns out that tilting modules correspond to actions with a dense orbit. Thus the fan classifies for those actions all instances admitting a dense orbit, and, in addition, defines representatives of the dense orbit. In a second application we consider actions of parabolic subgroups in a general linear group on ideals in the Lie algebra of the unipotent radical. It is convenient to fix the shape of the ideal and the number t of blocks of the parabolic group. Then we consider all those parabolic groups $P(d)$ (where $d = (d_1, \dots, d_t)$ denotes the block size) acting on the corresponding ideal $n(d)$ for all possible dimension vectors d simultaneously. We define the set $D(t)$ to be the set of all d , so that $P(d)$ acts with a dense orbit on $n(d)$. Then the set $D(t)$ is the set of lattice points in a fan.

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