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"Incoherent components of the Toric Hilbert scheme"

ZEIT:

18.10.2009, 15:15 Uhr

ORT:

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The classical Hilbert scheme is the scheme whose closed points are all subschemes of $\mathbb{P}^n$ with the same Hilbert function. That is, for $S = k[x_0, \dots, x_n]$ and an ideal $I \subset S$ the function $H(t) = \dim_k (S/I)_t$ whose value at d is the dimension over k of the degree t part of S/I . Endowing the ring S with a multigrading, i.e. the degree of x_i is $a_i \in \mathbb{N}$, we construct the multigraded Hilbert function. This is the analogon to the classical Hilbert function with degrees in $\mathbb{N}$ for some $d > 0$. Then one can consider all ideals $I \subset S$ with the same multigraded Hilbert function, these are the closed points of the multigraded Hilbert scheme. We consider the simplest case, taking the semigroup $\mathbb{N}^{n+1}$ and the multigraded Hilbert function

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