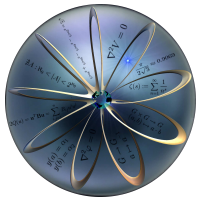

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## graded algebra

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|---|---|
| Canonical name | GradedAlgebra |
| Date of creation | 2013-03-22 12:45:47 |
| Last modified on | 2013-03-22 12:45:47 |
| Owner | mhale (572) |
| Last modified by | mhale (572) |
| Numerical id | 8 |
| Author | mhale (572) |
| Entry type | Definition |
| Classification | msc 16W50 |
| Related topic | GradedModule |
| Related topic | SuperAlgebra |
| Related topic | LieSuperalgebra |
| Related topic | LieSuperalgebra3 |

An algebra $A$ over a graded ring $B$ is *graded* if it is itself a graded ring and a graded module over $B$ such that

$$A^p \cdot A^q \subseteq A^{p+q}$$

where $A^i$, $i \in \mathbb{N}$, are submodules of $A$. More generally, one can replace $\mathbb{N}$ by a monoid or semigroup $G$. In which case, $A$ is called a $G$-graded algebra. A graded algebra then is the same thing as an $\mathbb{N}$-graded algebra.

Examples of graded algebras include the polynomial ring $k[X]$ being an $\mathbb{N}$-graded $k$-algebra, and the exterior algebra.