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On locally nilpotent derivations of Fermat Rings

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Resumo

Let $\mathbb{C}[X_1, \ldots, X_n]$ be the polynomial ring in n variables over complex numbers $\mathbb{C}$. Define

$$B_n^m = \frac{\mathbb{C}[X_1, \ldots, X_n]}{(X_1^m + \cdots + X_n^m)},$$

where $m \geq 2$ and $n \geq 3$. This ring is known as Fermat ring.

In a recent paper [4] D. Fiston and S. Maubach show that for $m \geq n^2 - 2n$ the unique locally nilpotent derivation of B_n^m is the zero derivation. Consequently the following question naturally arises: is the unique locally nilpotent derivation of the Fermat ring B_n^m for $m \geq 2$ and $n \geq 3$ the zero derivation?

In the paper [1] we show that the answer to this question is negative for $m = 2$ and $n \geq 3$. In other words, there exist locally nilpotent derivations over B_n^2 nontrivial. Furthemore, we show that these derivations are irreducible. In the general case, we prove that for certain classes of derivations of B_n^m the unique locally nilpotent derivation is the zero derivation.

The question remains open for the case $m \geq 3$.

Referências

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