

## Ideals generated by linear forms and symmetric algebras\*

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### Abstract

We consider ideals generated by linear forms in the variables  $X_1, \dots, X_n$  in the polynomial ring  $R[X_1, \dots, X_n]$ , being  $R$  a commutative, Noetherian ring with identity. We investigate when a sequence  $a_1, a_2, \dots, a_m$  of linear forms is an  $s$ -sequence, in order to compute algebraic invariants of the symmetric algebra of the ideal  $I = (a_1, a_2, \dots, a_m)$ .

MSC: 13C10, 13C15, 13D02

**keywords:** Symmetric algebra, linear forms, regularity.

## 1 Introduction

Let  $M$  be a finitely generated module on a commutative ring  $R$  with identity. Let  $A = (a_{ij})$  be a  $n \times m$  matrix, with entries in  $R$ ,  $I_k(A)$  the ideal generated by the  $k \times k$  minors of  $A$ ,  $1 \leq k \leq \min(m, n)$ , and let  $\varphi : R^m \rightarrow R^n$  be a module homomorphism. We denote by  $I_k(\varphi)$  the ideal  $I_k(A)$ , where  $A = (a_{ij})$  is the  $n \times m$  matrix associated to  $\varphi$ , for an appropriate choice of the bases.

Let

$$R^m \xrightarrow{\varphi} R^n \rightarrow M \rightarrow 0 \tag{1}$$

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