

Title: Irreducibility criteria for sums of two relatively prime multivariate polynomials

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We provide irreducibility conditions for some classes of multivariate polynomials over a field K , namely for polynomials of the form $f + p^k g$, where $f, g \in K[X_1, \dots, X_r]$, $\deg_r f < \deg_r g$, $p \in K[X_1, \dots, X_{r-1}]$ is irreducible over $K(X_1, \dots, X_{r-2})$, and $k \geq 1$ is an integer. More precisely, we prove that if f and g regarded as polynomials in X_r with coefficients in $K[X_1, \dots, X_{r-1}]$ are relatively prime over $K(X_1, \dots, X_{r-1})$, k is prime to $\deg_r g - \deg_r f$, and $\deg_{r-1} p^k$ is sufficiently large, then the polynomial $f + p^k g$ is irreducible over $K(X_1, \dots, X_{r-1})$.

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