EXTRACTA MATHEMATICAE Vol. **23**, Núm. 2, 173 – 180 (2008)

Autour d'un Théorème de Stein

Salah Najib

Université Lille 1, *Laboratoire Painlevé, U.F.R. Mathématiques,*
59655 *Villeneuve d'Ascq Cedex, France*
salah.najib@math.univ-lille1.fr, najibm@voila.fr

Presented by José A. de la Peña — Received March 20, 2008

Abstract: Let K be a field of characteristic zero, $\overline{K}$ an algebraic closure of K and $P(X,Y)$ a non constant polynomial, with coefficients in K. For $\lambda \in \overline{K}$, denote the number of distinct irreducible factors $f_{\lambda,i}$ in a factorization of $P - \lambda$ over $\overline{K}$ by $n(\lambda)$. We rewrite without the *jacobian derivation* aspect of Stein's proof (1989) for showing the following statement: if P is non-composite then $\sum_\lambda (n(\lambda) - 1)$ is at most equal to $\deg(P) - 1$.

Key words: Irreducible polynomial, composite polynomial, spectrum of a polynomial, Stein's inequality.

AMS *Subject Class.* (2000): 12E05, 11C08.

Références

[1] S.S. Abhyankar, W.J. Heinzer, A. Sathaye, Translates of polynomials, in "A tribute to C.S. Seshadri" (Chennai, 2002), Trends Math., Birkhäuser, Basel, 2003, 51 – 124.

[2] M. Ayad, Sur les polynômes $f(X,Y)$ tels que $K[f]$ est intégralement fermé dans $K[X,Y]$, *Acta Arith.* **105** (2002), 9 – 28.

[3] A. Bodin, P. Dèbes, S. Najib, On indecomposable polynomials and their spectrum (preprint).

[4] A. Bodin, P. Dèbes, S. Najib, Irreducibility of hypersurfaces, *Comm. Algebra* (to appear).

[5] A. Bodin, Reducibility of rational fractions in several variables, *Israel J. Math.* **164** (2008), 333 – 347.

[6] S. Lefshetz, "Algebraic Geometry", Princeton University Press, Princeton, N.J., 1953.

[7] S. Najib, Une généralisation de l'inégalité de Stein-Lorenzini, *J. Algebra* **292** (2) (2005), 566 – 573.

[8] S. Najib, "Factorisation des Polynômes $P(X_1,\ldots,X_n) - \lambda$ et Théorème de Stein", Thèse de Doctorat, Université Lille 1, 2005.

[9] A. Schinzel, Polynomials with special regards to reducibility, Encyclopedia of Mathematics and its Applications, **77**, Cambridge University Press, Cambridge, 2000.

[10] Y. Stein, The total reducibility order of a polynomial in two variables, *Israel J. Math.* **68** (1989), 109 – 122.