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Extendability of holomorphic differential forms near isolated hypersurface singularities.

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Let V be a germ of analytic hypersurface with isolated singularity at $0 \in \mathbf{C}^{n+1}$. Let $U = V - \{0\}$. A "differential of first kind" on V is a holomorphic form ω on U such that, for some resolution $\pi\colon \tilde{V} \to V$ of V, $\pi^*(\omega)$ extends to a holomorphic form on $\tilde{V}$.

Let d_k be the dimension of the $\mathbf{C}$-vector space of holomorphic k-forms on U modulo the subspace of k-differentials of first kind on V. Then d_k is finite and $d_k = 0$ if $k \leq n-2$ [G. M. Greuel, Math. Ann. **250** (1980), no. 2, 157–173; MR0582515 (82e:32009)]. Moreover, $q = d_{n-1}$ is the "irregularity" and $p_g = d_n$ is the "geometric genus" of V. In this article, the authors show how to calculate q and p_g in terms of the Gauss-Manin connection associated to the singularity. (For p_g see also a paper by M. Saito [*Singularities, Part 2* (Arcata, Calif., 1981), 465–472, Proc. Sympos. Pure Math., 40, Amer. Math. Soc., Providence, R.I., 1983; MR0713271 (85g:32019)].)

As an application, an example is given showing that q is not semicontinuous under deformations with constant Milnor number.

Reviewed by *M. Sebastiani*