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Erratum

Small Deformation of Normal Singularities

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This note corrects a mistake in the proof of Lemma 3.1 in [1]. The isomorphism

$$\mathrm{Ext}^i_{\mathcal{O}_{E'_*}}(\mathcal{O}_{E'_*}(-L_r+K_{E'_*}),\ \mathcal{O}(K_{E'_*}))\simeq \mathrm{Hom}_{\mathcal{O}_{C^*}}(R^{n-i}f_*\mathcal{O}_{E'_*}(-L_r+K_{E'_*}),\ \mathcal{O}_{C^*}),$$

which was described at *l*.9 in p. 145 does not follow Theorem 11.2, (*f*) (III, in [2]) immediately. Because we cannot apply the theorem to $\mathcal{O}_{C^*}$ which is not an injective module.

However the lemma remains true. In fact, in the original proof, the preceding isomorphism was used only to prove the assertions from *l*.11 to *l*.13 "there exists an integer r_0 such that for any $r \geqq r_0$, $f_*\mathcal{O}_{E'_*}(L_r)=0$ and $R^1f_*\mathcal{O}_{E'_*}(L_r)$ is zero (resp. torsion free) if $n \geqq 3$ (resp. $n=2$)." So, we will show the above assertions by a correct method below.

Applying the relative duality theorem (III, 11.1 in [2]) to the flat morphism $E'_* \to C^*$ of relative dimension $n-1$, we get

$$\mathbb{R}f_*\mathcal{O}_{E'_*}(L_r)\,[n-1]=\mathbb{R}\mathcal{H}om_{\mathcal{O}_{C^*}}(\mathbb{R}f_*\mathcal{O}(-L_r+K_{E'_*}),\ \mathcal{O}_{C^*}).$$

Note that there exists an integer r_0 such that, for any $r \geqq r_0$, $R^if_*\mathcal{O}_{E'_*}(-L_r+K_{E'_*})$ is 0 if $i>0$ and locally free if $i=0$ respectively. Since for $r \geqq r_0$, $\mathcal{E}xt^j_{\mathcal{O}_{C^*}}(f_*\mathcal{O}_{E'_*}(-L_r+K_{E'_*}),\ \mathcal{O}_{C^*})$ is 0 if $j>0$ and locally free if $j=0$, which yields $R^if_*\mathcal{O}_{E'_*}(L_r)$ is 0 for $i<n-1$ and locally free for $i=n-1$ respectively. This completes the proof of our assertions.

References

1. Ishii, S.: Small deformation of normal singularities. Math. Ann. **275**, 139–148 (1986)
2. Hartshorne, R.: Residues and duality. Lect. Notes Math. 20. Berlin, Heidelberg, New York: Springer 1966

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