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We now are in a position to globalize the local duality theorem. Suppose that $I \subset \mathcal{O}$ is a sheaf of regular ideals s.t the support $Z = \mathrm{supp}(\mathcal{O}/I)$ has dimension zero. Equivalently, locally $I = \{f_1, \cdots f_n\}$, where the f_i form a regular sequence and $n = \dim_{\mathbb{C}} M$.

See p 660.

We consider Z as a ringed space with structure sheaf $\mathcal{O}_Z = \mathcal{O}/I$.

We now refer to the intrinsic form of the local duality theorem in Section 3 above. According to the proposition in that section, the sheaves $\underline{\mathrm{Ext}}^q_{\mathcal{O}}(\mathcal{O}_Z, \Omega^n) = 0$ for $q < n$.

$\mathcal{O}_Z = \mathcal{O}/I \Rightarrow (\mathcal{O}_Z)_x \cong \mathcal{O}_x/I_x$

$\Omega^n_x \cong \mathcal{O}_x$

$\Rightarrow \underline{\mathrm{Ext}}^q_{\mathcal{O}}(\mathcal{O}_Z, \Omega^n)_x \cong \mathrm{Ext}^q_{\mathcal{O}}(\mathcal{O}_x/I_x, \mathcal{O}_x) = 0$ for $q < n$

$n = \# \{f_1, \cdots f_n\}$. See p 690.

Moreover, since the sheaves $\mathcal{O}_Z$ and $\underline{\mathrm{Ext}}^n_{\mathcal{O}}(\mathcal{O}_Z, \Omega^n)$ are sky scraper sheaves,

$$\begin{cases} H^0(M, \mathcal{O}_Z) \cong \bigoplus_{p \in Z} \mathcal{O}_{Z,p} \\ H^0(M, \underline{\mathrm{Ext}}^n_{\mathcal{O}}(\mathcal{O}_Z, \Omega^n)) \cong \bigoplus_{p \in Z} \underline{\mathrm{Ext}}^n_{\mathcal{O}_p}(\mathcal{O}_{Z,p}, \Omega^n_p) \\ H^q(M, \mathcal{O}_Z) = H^q(M, \underline{\mathrm{Ext}}^n_{\mathcal{O}}(\mathcal{O}_Z, \Omega^n)) = 0 \text{ for } q > 0. \end{cases}$$