These methods may be generalized to prove the Cayley - Bacharcch theorem from Section 4.

## 4. Global Duality.

### Global Ext.

Let $M$ be a compact, complex manifold and $\mathcal{L}$ the invertible sheaf associated to a positive line bundle $L \to M$. Given coherent sheaves $\mathcal{F}, \mathcal{G}$ on $M$, and using Theorem A discussed in the previous section, we may find a global syzygy

$$0 \to \mathcal{E}_n \to \mathcal{E}_{n-1} \to \cdots \to \mathcal{E}_1 \to \mathcal{E}_0 \to \mathcal{F} \to 0$$

for $\mathcal{F}$. This gives rise to a complex of sheaves $\mathrm{Hom}_{\mathcal{O}}(\mathcal{E}.(\mathcal{F}), \mathcal{G})$, whose associated hypercohomology we take as the definition of global Ext, written

$$\mathrm{Ext}(M; \mathcal{F}, \mathcal{G}) = \mathbb{H}^*(M, \mathrm{Hom}_{\mathcal{O}}(\mathcal{E}.(\mathcal{F}), \mathcal{G}).$$

"$\mathcal{O}/I$ finite dimensional complex vector space with $\dim_{\mathbb{C}}(\mathcal{O}/I) = d =$ degree of $f$."

To show this, we need the following theorems and corollary, from Introduction to holomorphic functions of several variables.

5. Theorem. (P32). If $\pi : V \to W$ is a finite branched holo