Remark : $M \subset N$ subspace $\mathcal{F}$ sheaf on M.
We can extend $\mathcal{F}$ by zero to obtain a sheaf $\tilde{\mathcal{F}}$ on N, setting

$$\tilde{\mathcal{F}}(U) = \mathcal{F}(U \cap M).$$

and letting the restriction maps be the obvious ones.
Thus we consider $\mathcal{F}$ as a sheaf on either M or N.

Examples

1. On any complex manifold,

$$0 \longrightarrow \mathbb{Z} \xrightarrow[\ ]{i \to \text{inclusion}} \mathcal{O} \xrightarrow{\exp} \mathcal{O}^* \longrightarrow 0 \quad \text{is exact.}$$

This fundamental sequence is called the exponential sheaf sequence.

$\ker \exp = \operatorname{im} i$.

① $\operatorname{im} i \subset \ker \exp$

$\exp(i(U)(n)) = e^{2\pi i n} = 1. \Rightarrow i(U)(n) \in (\ker \exp)(U)$.

② $\ker \exp \subset \operatorname{im} i$.

(U, σ). $\sigma \in \mathcal{O}(U)$. $p \in U$.

$\exp(\sigma) = 0 = \exp^{2\pi i \sigma} = 1 \quad \Rightarrow \sigma$ is integer valued function and σ is continuous $\Rightarrow \sigma =$ constant.

$\Rightarrow \exists$ a contractible open set $V_p \subset U$ s.t $f \in \mathcal{O}(V_p)$ s.t $f = \sigma$ on V_p.

$\operatorname{im} \exp = \mathcal{O}^*$.

Given $f \in \mathcal{O}^*(U)$, $\exists V_p$ s.t $\exists g$ s.t $\exp g = f$

If V_p is contractible, it is possible.