Furthermore, the pair $(\mathcal{F}^+, \theta)$ is unique up to unique isomorphism. $\mathcal{F}^+$ is called the sheaf associated to the presheaf $\mathcal{F}$.

pf) Construct the sheaf $\mathcal{F}^+$ as follows:
For any open set U, let $\mathcal{F}^+(U)$ be the set of functions s from U to the union $\bigcup_{p \in U} \mathcal{F}_p$ of the stalks of $\mathcal{F}$ over points of U, such that.

(1) for each $p \in U$, $s(p) \in \mathcal{F}_p$.
(2) for each $p \in U$, $\exists$ an open nbd $V_p \ni p$. $V_p \subset U$, and an element $t \in \mathcal{F}(V_p)$ s.t

for all $q \in V_p$, the germ t_q of t at q is equal to $s(q)$.

$\mathcal{F}^+ = \{ (U, s) \mid s \in \mathcal{F}(U) \}$. U open $\subset X$.

(i) $\mathcal{F}^+$ is a sheaf.

$\mathcal{F}^+(U) = \{ s : U \longrightarrow \bigcup_{p \in U} \mathcal{F}_p$ s.t for $\forall p \in U$, $s(p) \in \mathcal{F}_p$.

for each $p \in U$. $\exists$ an open nbd $V_p \ni p$. $V_p \subset U$. and an element $t \in \mathcal{F}(V_p)$ s.t
for all $q \in V_p$. the germ t_q of t at q is equal to $s(q)$. $\}$ abelian group.

$\mathcal{F}^+(\phi) = \cancel{\phi}\, 0$.

$U \supset V \supset W$

$$\begin{array}{ccccc} \mathcal{F}^+(U) & \longrightarrow & \mathcal{F}^+(V) & \longrightarrow & \mathcal{F}^+(W) \\ \rotatebox{90}{$\in$} & & \rotatebox{90}{$\in$} & & \\ s & \longmapsto & s|_V & \longrightarrow & s|_V|_W = s|_W \end{array}$$

O.K.