An (Abridged) Intro To Sheaves

IDEA Structure on smooth spaces
manifolds
is given by C^∞ functions into $\mathbb{R}$

— 1.5 min.

$\mathbb{R}$ $\mathbb{R}^n$

"Def" Fix a set T. A sheaf on $X \in \mathrm{Top}$ is given by associating each open $U \subseteq X$ to some $\mathcal{F}(U) \subseteq \mathrm{Fun}(X, T)$

satisfying

nothing	analytic	~~bounded~~
continuous	polynomial	
differentiable	regular	
C^α, C^∞		

2.5–3 min

$\rightsquigarrow (X \in \mathrm{Top},\ \mathcal{O}_X \in \mathrm{Sh}(X))$

Q. What maps preserve structure?

$(X, \mathcal{O}_X) \longrightarrow (Y, \mathcal{O}_Y)$ is $X \xrightarrow{f} Y$ as + structure relating sheaves. This is a set of fcns

$$\mathcal{O}_Y(V) \longrightarrow \mathcal{O}_X(f^{-1}(V)) \quad \forall V \subseteq Y \text{ open. (satisfying } \cdots)$$

Prop. A smooth map $\mathbb{R}^n \to \mathbb{R}^m$ is exactly a "morphism"

$$(\mathbb{R}^n, C^\infty) \longrightarrow (\mathbb{R}^m, C^\infty),$$

w/ the structure given by precomp. — 3min

"Def" A smooth manifold is a $\cdots$ — if time