

This note, that [was found here](#), as a part of [a collection](#) is written (completely with human hands) by [Rupadarshi Ray](#), was created on November 19, 2025 9:06:25 PM, was last modified on September 7, 2026 12:53:54 AM, and was exported on September 7, 2026 3:24:50 PM.

k -functioned space

Definition. k -functioned space

Let k be a field. A **k -functioned space** is a pair $(X, \mathcal{O}_X)$ comprising of a topological space X and a sheaf $\mathcal{O}_X$ of unital k -algebra of functions $X \rightarrow k$

$$\mathcal{O}_X(U) \leq X^k$$

for open subsets $U \subseteq W$.

Example

- Topological spaces X and sheaf $\mathcal{C}_X$ of continuous functions to $\mathbb{R}$ or $\mathbb{C}$
- Smooth manifolds M and sheaf $\mathcal{C}_M^\infty$ of smooth functions
- Complex manifolds M and sheaf $\mathcal{O}_M$ of holomorphic functions
- Affine algebraic varieties, algebraic varieties

Definition. Morphism of k -functioned space

Let $(X, \mathcal{O}_X)$ and $(Y, \mathcal{O}_Y)$ be k -functioned spaces. A *continuous* map $\varphi : X \rightarrow Y$ is a **morphism of k -functioned spaces** if

$$f \in \mathcal{O}_Y(U) \implies \varphi^* f := f \circ \varphi \in \mathcal{O}_X(\varphi^{-1}(U))$$

for all open subsets $U \subseteq Y$.

Definition.

$\mathbf{FS}_k$

Let k be a field. Then let $\mathbf{FS}_k$ denote the category where

- objects are

Definition. k -functioned space

Let k be a field. A **k -functioned space** is a pair $(X, \mathcal{O}_X)$ comprising of a topological space X and a sheaf $\mathcal{O}_X$ of unital k -algebra of functions $X \rightarrow k$

$$\mathcal{O}_X(U) \leq X^k$$

for open subsets $U \subseteq W$.

- morphisms are

Definition. Morphism of k -functioned space

Let $(X, \mathcal{O}_X)$ and $(Y, \mathcal{O}_Y)$ be k -functioned spaces. A *continuous* map $\varphi : X \rightarrow Y$ is a **morphism of k -functioned spaces** if

$$f \in \mathcal{O}_Y(U) \implies \varphi^* f := f \circ \varphi \in \mathcal{O}_X(\varphi^{-1}(U))$$

for all open subsets $U \subseteq Y$.

- and composition of morphisms are usual composition of maps

Current note has 0 direct children and 0 total descendants.

- [structures based on sets](#)
 - [Topological spaces](#)
 - [Ringed topological spaces](#)
 - [k-functioned space](#)

And it has 1 siblings.

- [structures based on sets](#)
 - [Topological spaces](#)
 - [Ringed topological spaces](#)
 - [k-functioned space](#)