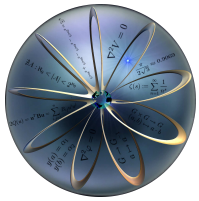

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direct image (functor)

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If $f : X \to Y$ is a continuous map of topological spaces, and if $\mathbf{Sheaves}(X)$ is the category of sheaves of abelian groups on X (and similarly for $\mathbf{Sheaves}(Y)$), then the direct image functor $f_* : \mathbf{Sheaves}(X) \to \mathbf{Sheaves}(Y)$ sends a sheaf $\mathcal{F}$ on X to its direct image $f_*\mathcal{F}$ on Y. A morphism of sheaves $g : \mathcal{F} \to \mathcal{G}$ obviously gives rise to a morphism of sheaves $f_*g : f_*\mathcal{F} \to f_*\mathcal{G}$, and this determines a functor.

If $\mathcal{F}$ is a sheaf of abelian groups (or anything else), so is $f_*\mathcal{F}$, so likewise we get direct image functors $f_* : \mathbf{Ab}(X) \to \mathbf{Ab}(Y)$, where $\mathbf{Ab}(X)$ is the category of sheaves of abelian groups on X.