Info

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$\mathbb{C}$-manifolds

Definition. $\mathbb{C}$-manifolds

Let M be a smooth $\mathbb{R}$-manifold of even $\mathbb{R}$-dimension $2n$.
A smooth atlas on a smooth $\mathbb{R}$-manifold is **homomorphic** $\mathcal{A}_{\mathscr{O}}$ if for any pair of charts, the transition functions are *biholomorphic*

$$(U,z),(V,w) \in \mathcal{A}_{\mathscr{O}} \implies z \circ w^{-1} \in \mathscr{O}(\mathbb{C}^n)$$

It determines a maximal holomorphic atlas $\mathcal{A}_{\mathscr{O}}^{\max}$ *holomorphic (or complex) structure*. Then

$$(M, \mathcal{T}_M, \mathcal{A}_{\mathscr{O}})$$

is a complex $\mathbb{C}$-manifold of $\mathbb{C}$-dimension n.

Definition.

$$\mathscr{O}(M,N) := \{f : M \to N : f \text{ is holomorphic}\}$$