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line bundle

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In algebraic geometry, the term line bundle refers to a locally free coherent sheaf of rank 1, also called an invertible sheaf. In manifold theory, it refers to a real or complex one dimensional vector bundle. These notions are equivalent on a non-singular complex algebraic variety  $X$ : given a one dimensional vector bundle, its sheaf of holomorphic sections is locally free and of rank 1. Similarly, given a locally free sheaf  $\mathcal{F}$  of rank one, the space

$$\mathcal{L} = \cup_{x \in X} \mathcal{F}_x / \mathfrak{m}_x \mathcal{F}_x,$$

given the coarsest topology for which sections of  $\mathcal{F}$  define continuous functions in a vector bundle of complex dimension 1 over  $X$ , with the obvious map taking the stalk over a point to that point.