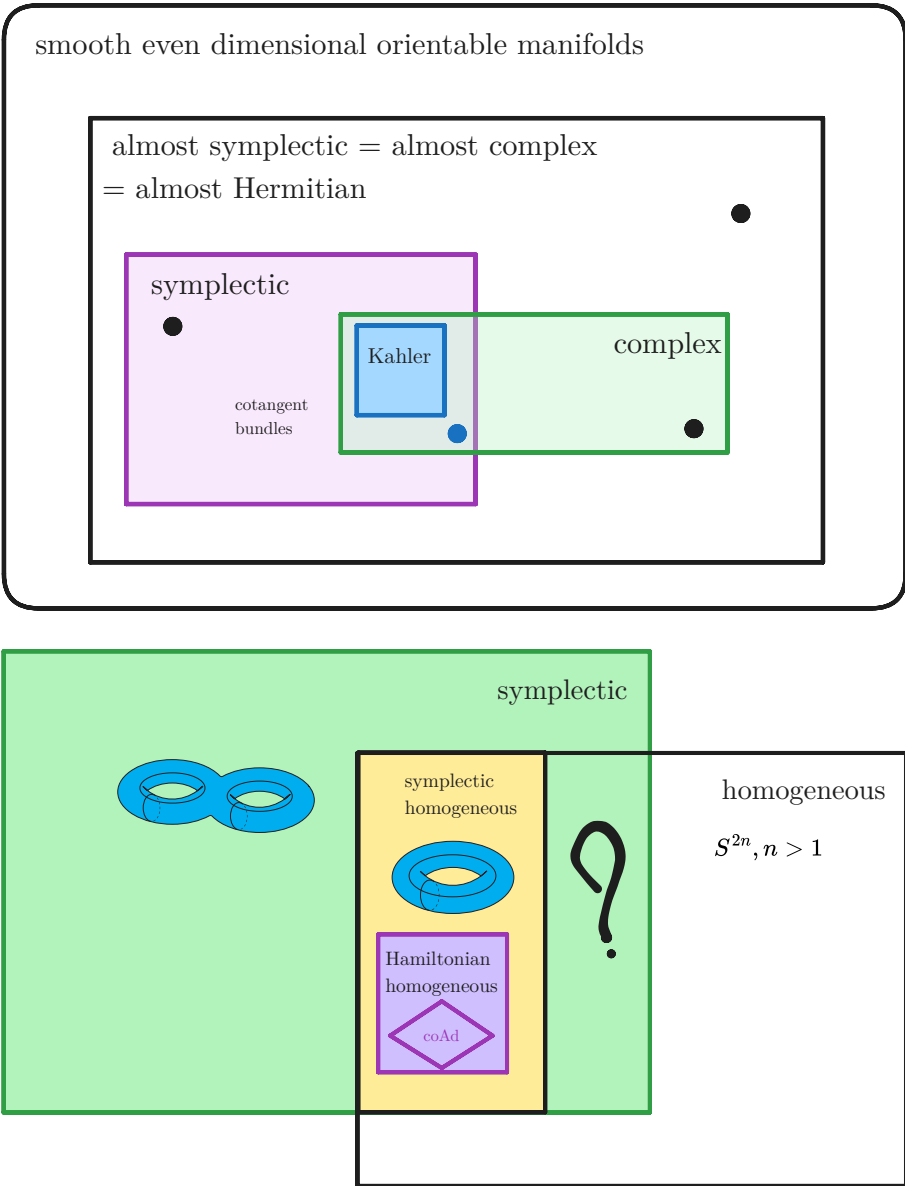


This note, that [was found here](#), as a part of [a collection](#) is written (completely with human hands) by [Rupadarshi Ray](#), was created on June 1, 2023 10:37:13 PM, was last modified on May 2, 2026 2:39:38 PM, and was exported on September 7, 2026 3:31:17 PM.

Symplectic manifold

Definition. A symplectic manifold (M, ω) is a [smooth manifold](#) M with a closed non-degenerate 2-form ω .



A symplectic manifold must be

- even dimensional
- an orientable manifold because ω^n is a volume form

Furthermore,

- if M is also compact then

$$\forall k > 0, H^{2k}(M) \neq 0$$

because $[\omega^k] \in H^{2k}(\Omega^\bullet)$

A symplectic manifold is

- locally symplectomorphic to $(\mathbb{R}^{2n}, \omega_{\mathbb{R}^{2n}})$

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- [structures based on sets](#)
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 - [ℝ-manifold symplectic](#)
 - [Symplectic capacities](#)
 - [Compatible almost complex structure on a symplectic manifold](#)
 - [Generating symplectomorphisms](#)
 - [Symplectic homogeneous manifolds](#)
 - [Quantization of symplectic manifolds](#)
 - [Lagrangian submanifolds of a symplectic manifold](#)
 - [Symplectic Lie group action on a symplectic manifold](#)
 - [Hamiltonian vector fields on a symplectic manifold](#)
 - [Integrable Hamiltonian flows](#)
 - [Singular integrable flows](#)
 - [Hamiltonian Lie group action on a symplectic manifold](#)
 - [Quantization of Hamiltonian Lie group action on a symplectic manifold](#)
 - [Probability states and flows of an Hamiltonian system](#)

And it has 20 siblings.

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 - [ℂ-manifold](#)
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 - [Kahler manifolds](#)
 - [Kahler manifolds of complex dimension 2, AKA Kahler surfaces](#)
 - [smooth ℝ-manifold](#)
 - [Principal bundles over smooth manifolds](#)
 - [Manifold with a flow](#)

- [\$\mathbb{R}\$ -manifold group \(Lie groups\)](#)
- [Homogeneous manifold](#)
- [Finsler manifold](#)
- [\$\mathbb{R}\$ -manifold semi-Riemannian](#)
- [Sub-Riemannian manifolds](#)
- [\$\mathbb{R}\$ -manifold Poisson](#)
- [\$\mathbb{R}\$ -manifold symplectic](#)
- [Multisymplectic manifolds](#)
- [Spin \$\mathbb{R}\$ -manifold](#)
- [\$\mathbb{R}\$ -manifold topological](#)
- [Toric manifolds](#)
- [Manifolds with compatible triples](#)