

This note, that [was found here](#), as a part of [a collection](#) is written (completely with human hands) by [Rupadarshi Ray](#), was created on August 4, 2024 3:34:01 PM, was last modified on July 13, 2025 1:54:11 PM, and was exported on September 7, 2026 3:31:14 PM.

Manifolds with compatible triples

Definition. Smooth manifold with compatible triples

A smooth manifold with a compatible triple

(M, ω, J, g)

consists of

- almost symplectic structure ω
- almost complex structure J
- a Riemannian metric g

which satisfy

J = g^{-1}ω^{-1}

This gives

- two volume forms λ_g and ω^{dim M/2}, which *may* differ but of course there exists a never vanishing s ∈ C^∞(M) such that

sλ_g = ω^{dim M/2}

- J-rotation of gradient vector fields **match** with ω-[Hamiltonian vector fields](#)

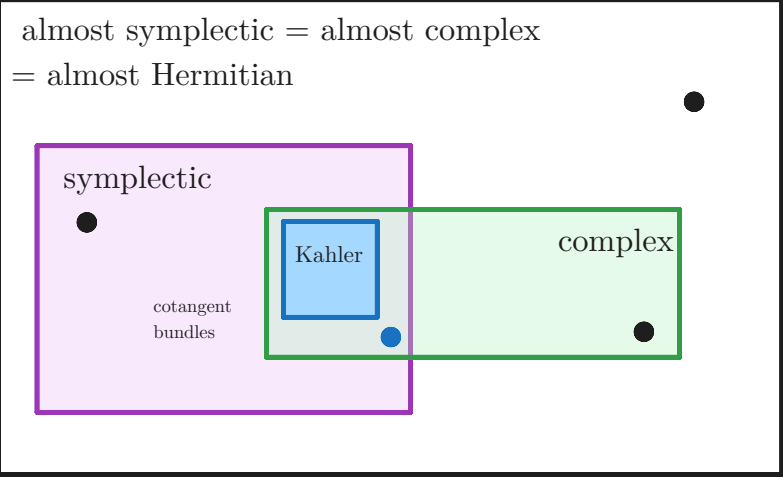
g(grad(f), -) = df(-) = -ω(X_f, -)
⇒ g(grad(f), -) = -g(JX_f, -)
⇒ X_f = Jgrad(f)

Proposition:

given (ω almost symplectic)	with the condition	we have the third structure
ω, J	ω(-, J-) is a Riemannian metric	g := ω(-, J-) is Riemannian
ω, g	none	J using polar decomposition
g, J	J is orthogonal, as in g(J-, J-) = g(-, -) ⇔ g(J-, -) = -g(-, J-) (almost Hermitian)	ω := g(J-, -) is almost symplectic

[1]

smooth even dimensional orientable manifolds



Current note has 0 direct children and 0 total descendants.

- [structures based on sets](#)
 - [manifolds](#)
 - [Manifolds with compatible triples](#)

And it has 20 siblings.

- [structures based on sets](#)
 - [manifolds](#)
 - [Closed aspherical manifolds](#)
 - [ℂ-manifold](#)
 - [Hermitian manifolds](#)
 - [Kahler manifolds](#)
 - [Kahler manifolds of complex dimension 2, AKA Kahler surfaces](#)
 - [smooth ℝ-manifold](#)
 - [Principal bundles over smooth manifolds](#)
 - [Manifold with a flow](#)
 - [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](#)
- [\$\text{Spin } \mathbb{R}\$ -manifold](#)
- [\$\mathbb{R}\$ -manifold topological](#)
- [Toric manifolds](#)
- [Manifolds with compatible triples](#)