

This note, that [was found here](#), as a part of [a collection](#) is written (completely with human hands) by [Rupadarshi Ray](#), was created on September 18, 2024 10:13:46 PM, was last modified on May 17, 2026 7:36:51 PM, and was exported on September 7, 2026 3:31:17 PM.

Lagrangian submanifolds of a symplectic manifold

Definition. Lagrangian submanifolds of a symplectic manifold

Let (M, ω) be a symplectic manifold. A submanifold $Y \subset M$ is a **lagrangian submanifold** of M if

- $\omega|_Y \equiv 0$
- $\dim Y = \dim M/2$

hunting for Lagrangian submanifolds

Everything is a lagrangian submanifold (A. Weinstein's lagrangian creed...)

- A diffeomorphism $\phi : M_1 \rightarrow M_2$ between symplectic manifolds is a symplectomorphism $\iff$ the graph as a submanifold of $M_1 \times M_2$ is Lagrangian for the form $\pi_1^*\omega_1 - \pi_2^*\omega_2$.^[1]
- In T^*M
 - The graph of the 1-form $\alpha : M \rightarrow T^*M$ is a Lagrangian submanifold of $T^*M \iff d\alpha = 0$.
 - Every manifold $M \subset T^*M$ is the Lagrangian zero section of its cotangent bundle, which is the graph of the closed form 0.
 - $T_p^*M \subset T^*M$
- Image of a Lagrangian submanifold under a symplectomorphism is Lagrangian.

Current note has 0 direct children and 0 total descendants.

- [structures based on sets](#)
 - [manifolds](#)
 - [ℝ-manifold symplectic](#)
 - [Lagrangian submanifolds of a symplectic manifold](#)

And it has 8 siblings.

- [structures based on sets](#)
 - [manifolds](#)
 - [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](#)

1. <https://math.stackexchange.com/a/892578> ↩