ⓘ Info

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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

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

hunting for Lagrangian submanifolds

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

- A diffeomorphism $\phi : M_1 \to M_2$ 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 $\alpha : M \to T^*M$ is a Lagrangian submanifold of T^*M $\iff$ $\mathrm{d}\alpha = 0$.
  - 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.

And it has 8 siblings.

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