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Conjugating the Laplacian

Let (M_1, g_1) and (M_2, g_2) be Riemannian manifolds and Δ_1, Δ_2 be their respective Laplace operators and

$$\phi : M_1 \rightarrow M_2$$

is a diffeomorphism. Then ϕ is an isometry $\iff$

$$\forall f \in \mathcal{C}^\infty(M_2), \Delta_1(f \circ \phi) = (\Delta_2 f) \circ \phi$$

[1]



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 - [ℝ-manifold semi-Riemannian](#)
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1. <https://math.stackexchange.com/a/1349556/1290493> ↩