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Universal cover of semi-Riemannian manifolds

Proposition: Let (M, g) be a simply connected Riemannian manifold and suppose Γ_1, Γ_2 be countable subgroups of $\text{Isom}(M, g)$ acting smoothly, freely, properly (when endowed with the discrete topology). Let $X_i := M/\Gamma_i$ be the Riemannian *covering* quotient manifold. Then

- then any isometry

$$\Phi : (M_1, g_1) \rightarrow (M_2, g_2)$$

lifts to a $\tilde{\Phi} \in \text{Isom}(M, g)$ such that $\tilde{\Phi}$

- there is a $f \in \text{Isom}(M, g)$ such that $f\Gamma_1f^{-1} = \Gamma_2$ then

$$f_{\sim} : (M_1, g_1) \rightarrow (M_2, g_2)$$

is an isometry.

[1]

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