

This note, that [was found here](#), as a part of [a collection](#) is written (completely with human hands) by [Rupadarshi Ray](#), was created on July 18, 2025 5:45:32 PM, was last modified on January 29, 2026 3:16:42 PM, and was exported on September 7, 2026 3:31:16 PM.

Compact Lie groups

Every compact Lie group has a **faithful** finite dimensional *unitary* representation.

So every compact Lie group G is a **closed subgroup** of $U(n)$ for some $n \gg 1$.

Lie algebra

Lie algebra of a compact Lie group is **reductive**.

Classification of compact Lie groups

[1]

The isomorphism classes of

- *simply connected* **compact** semi-simple $\mathbb{R}$ -Lie groups G
- compact semi-simple Lie $\mathbb{R}$ -algebra $\text{Lie}(G)$
- semi-simple Lie $\mathbb{C}$ -algebras $\text{Lie}(G) \otimes \mathbb{C}$
- reduced abstract root systems

are in one-to-one correspondence.

Current note has 0 direct children and 0 total descendants.

- [structures based on sets](#)
 - [manifolds](#)
 - [ℝ-manifold group \(Lie groups\)](#)
 - [Compact Lie groups](#)

And it has 18 siblings.

- [structures based on sets](#)
 - [manifolds](#)
 - [ℝ-manifold group \(Lie groups\)](#)
 - [Adjoint representation of a Lie group](#)
 - [Conjugation action of a Lie group on itself](#)
 - [Classification of Lie groups](#)
 - [Compact Lie groups](#)
 - [Connected Lie groups with discrete center](#)
 - [Connected Lie groups with non-surjective exponential map](#)
 - [Discrete subgroups of Lie groups](#)
 - [Smooth maps onto a Lie group](#)
 - [Lie groups with surjective exponential map](#)
 - [Maurer-Cartan form](#)
 - [Left-invariant Lagrangian on a Lie group](#)
 - [Lie algebra of a lie group](#)
 - [Bi-invariant metrics on Lie groups](#)
 - [Left invariant Riemannian metric on a Lie group](#)
 - [Semi-simple ℝ-Lie groups](#)
 - [Almost simple groups](#)
 - [Virtual subgroups of Lie groups](#)
 - [Lie group with dilations](#)

1. <https://mathoverflow.net/a/25240/562926> ↩