Lie algebras and Lie groups

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This content is standard, one reference is [Ser92]. Note that there analytic groups are used, however by our notes this is equivalent to smooth things.

Theorem (II.5.8 Thm 2,4)**.** *The category of connected simply connected analytic groups over* $\mathbb{R}$ *or* $\mathbb{C}$ *is equvalent to the category of finite dimensional Lie algebras over* $\mathbb{R}$ *or* $\mathbb{C}$ *.*

This equivalence moreover sends ideals to closed subgroups.

Serre also has some more general results on similar functors for complete characteristic 0 fields, however they are not as simple, as they require this strange "group chunk" notion.

References

[Ser92] Jean-Pierre Serre. *Lie Algebras and Lie Groups*, volume 1500 of *Lecture Notes in Mathematics*. Springer, Berlin, Heidelberg, 1992.