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Section:

7. Lie Groups and Lie Algebras

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Finitary simple Lie algebras

A Lie algebra is called *finitary* if it consists of finite-rank transformations of a vector space. Finitary simple Lie algebras over a field F of characteristic zero are classified. Below is the list of all complex (see [1]) and real finitary simple Lie algebras of countable dimension. They can be represented as the direct limits of natural embeddings of the relevant finite-dimensional algebras.

$F = \mathbf{C}$: $sl_\infty(\mathbf{C})$, $so_\infty(\mathbf{C})$, $sp_\infty(\mathbf{C})$.
$F = \mathbf{R}$: $sl_\infty(\mathbf{C})$, $so_\infty(\mathbf{C})$, $sp_\infty(\mathbf{C})$; $sl_\infty(\mathbf{R})$, $su_\infty(\mathbf{C}, k)$, $sl_\infty(\mathbf{H})$, $so_\infty(\mathbf{R}, k)$, $so_\infty(\mathbf{H}, k)$, $sp_\infty(\mathbf{R})$, $sp_\infty(\mathbf{H})$, $k = 0, 1, \ldots, \infty$.

Reference: [1] A. A. Baranov, Simple diagonal locally finite Lie algebras, *Proc. London Math. Soc.* (to appear).