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Complete (curved) Lie algebras as models of spaces

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The rational homotopy type of simply connected spaces is fully captured by its Quillen model, a differential graded Lie algebra constructed from the space. Conversely, any positively graded differential Lie algebra can be "realized" as a topological space, with rational homotopical and homological invariants preserved by these two functors.

However, these constructions are inherently limited to connected and simply connected spaces. To remove these constraints, we must move to the category of complete Lie algebras. Within this category, there exists a cosimplicial object that gives rise to a pair of adjoint functors between the categories of complete Lie algebras and topological spaces.

In this talk, we will explore the
construction of this pair of functors and some important properties. Concretely, we will show that composing both of them results in the Bousfield-Kan $\mathbb{Q}$-completion. Additionally, we will discuss how this framework can be extended to curved Lie algebras, leading to a "base pointless" theory.

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