

Lie algebroid modules and representations up to homotopy

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We explain how Lie algebroid modules in the sense of Vaintrub provide geometric models for Lie algebroid representations up to homotopy. Specifically, we show that there is a noncanonical way to obtain representations up to homotopy from a given Lie algebroid module, and that any two representations up to homotopy obtained in this way are equivalent in a natural sense. This result extends the relationship between VB-algebroids and 2-term representations up to homotopy, as studied by Gracia-Saz and the author. We also extend the construction of VB-algebroid characteristic classes to the setting of Lie algebroid modules.

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