RIT-algebras, their representations, and Milnor’s conjecture
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I intend to discuss the classification problem for finite-dimensional modules over the simplest RIT algebra: $\langle x, y \mid xy - yx = y^2 \rangle$. I’ll describe its automorphism group, prove an analogue of the Gerstenhaber theorem, residually finite-dimensionality and some structural results on the images of reps in endomorphism rings. While the complete classification of isoclasses of indecomposables is not possible (the algebra is wild), we suggest some new ways of classification: up to automorphisms, by images or their quivers.

The investigation of finite-dimensional representations of RIT algebras have lead to the discovery of surprising connection between this theory and Milnor’s conjecture on the existence of left invariant affine structure on nilpotent Lie group.