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Tan, Shaobin [Tan, Shao Bin] (PRC-XIAM-SM);
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Some categories of modules for toroidal Lie algebras. (English summary)
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Irreducible integrable modules with finite-dimensional weight spaces for toroidal Lie algebras have been classified in [S. Eswara Rao, J. Algebra **277** (2004), no. 1, 318–348; MR2059633]. This paper is concerned with the question whether we can apply the formal variable technique in [H. Li, Math. Z. **248** (2004), no. 3, 635–664; MR2097377] within the realm of toroidal Lie algebras. Given a toroidal Lie algebra τ, the authors define two categories $\mathcal{E}_\tau$ and $\mathcal{C}_\tau$. The former category $\mathcal{E}_\tau$, analogous to the category $\mathcal{E}$ investigated in [H. Li, op. cit.], is shown to contain the evaluation modules studied in [S. Eswara Rao, op. cit.]. It is also shown that every irreducible integrable τ-module in the category $\mathcal{E}_\tau$ is isomorphic to a finite-dimensional evaluation module, settling the classification problem in $\mathcal{E}_\tau$. In [J. Algebra **365** (2012), 50–82; MR2928453] Li and the last two authors of the paper under review developed a theory of toroidal vertex algebras and their modules, establishing the canonical correspondence between restricted modules of τ and modules of its corresponding toroidal vertex algebra, so that restricted modules for toroidal Lie algebras are no less important from the standpoint of representation theory of toroidal vertex algebras. In the latter category $\mathcal{C}_\tau$, containing evaluation modules, certain restricted τ-modules, and their tensor products, the irreducible τ-modules are described as the tensor products of some entities of the former two types, settling the classification problem in $\mathcal{C}_\tau$. *Hirokazu Nishimura*

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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.