Computation of cohomology of vertex algebras

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Abstract. We review cohomology theories corresponding to the chiral and classical operads. The first one is the cohomology theory of vertex algebras, while the second one is the classical cohomology of Poisson vertex algebras (PVA), and we construct a spectral sequence relating them. Since in "good" cases the classical PVA cohomology coincides with the variational PVA cohomology and there are well-developed methods to compute the latter, this enables us to compute the cohomology of vertex algebras in many interesting cases. Finally, we describe a unified approach to integrability through vanishing of the first cohomology, which is applicable to both classical and quantum systems of Hamiltonian PDEs.

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