

High Energy Physics - Theory

Form factors of descendant operators: $A^{\{1\}}_{L-1}$ affine Toda theory

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In the framework of the free field representation we obtain exact form factors of local operators in the two-dimensional affine Toda theories of the $A^{\{1\}}_{L-1}$ series. The construction generalizes Lukyanov's well-known construction to the case of descendant operators. Besides, we propose a free field representation with a countable number of generators for the 'stripped' form factors, which generalizes the recent proposal for the sine/sinh-Gordon model. As a check of the construction we compare numbers of the operators defined by these form factors in level subspaces of the chiral sectors with the corresponding numbers in the Lagrangian formalism. We argue that the construction provides a correct counting for operators with both chiralities. At last we study the properties of the operators with respect to the Weyl group. We show that for generic values of parameters there exist Weyl invariant analytic families of the bases in the level subspaces.

Comments: 26 pages; v2: a misprint corrected; an acknowledgment added

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