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The PBW filtration

We study the PBW filtration on irreducible integrable highest weight representations of an affine Kac-Moody algebra g . The n -th space of this filtration is spanned with the vectors $x_1 \dots x_s v$, where $x_i \in g$, $s \leq n$ and v is a highest weight vector. For the vacuum module we give a conjectural description of the corresponding adjoint graded space in terms of generators and relations. For g of the type A_1 we prove our conjecture and derive the fermionic formula for the graded character.