Characterization of Simple Highest Weight Modules
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Abstract. We prove that for simple complex finite dimensional Lie algebras, affine Kac-Moody Lie algebras, the Virasoro algebra and the Heisenberg-Virasoro algebra, simple highest weight modules are characterized by the property that all positive root elements act on these modules locally nilpotently. We also show that this is not the case for higher rank Virasoro and for Heisenberg algebras.