

**Fred Richman**

*Smooth invariants and  $\omega$ -graded modules over  $k[X]$*

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**Abstract:** It is shown that every  $\omega$ -graded module over  $k[X]$  is a direct sum of cyclics. The invariants for such modules are exactly the smooth invariants of valuated abelian  $p$ -groups.

**Keywords:** filtered modules, valuated groups, representations of quivers

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