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**Daniel R Jordan\*** (djordan@colum.edu), Columbia College Chicago, Department of Science & Math, 600 S. Michigan Ave., Chicago, IL 60605-1996. *A Grothendieck Module with Applications to Rationality of the Poincaré Series.*

The Grothendieck module associated to a ring  $A$ , denoted  $\mathcal{G}_A$  is defined to be the free  $\mathbb{Z}[t, \frac{1}{t}]$  module generated by isomorphism classes of finitely generated  $A$ -modules subject to relations arising from certain short exact sequences. It is designed to encode shifts of degree between the *Tor* modules (and hence the Betti numbers) of finitely generated  $A$ -modules, and has the property that if a module is torsion in  $\mathcal{G}_A$ , then the Poincaré series of that module is rational.

Several fundamental results will be discussed, including results which demonstrate that being a torsion element in the Grothendieck module is a stronger condition than having rational Poincaré series; and that the annihilator provides more information than does the denominator of the rational form of the Poincaré series. (Received July 24, 2007)