1085-13-175 **Amanda Croll***, 203 Avery Hall, University of Nebraska-Lincoln, P.O. Box 880130, Lincoln, NE 68505. *Periodic modules over a Gorenstein local ring.* Preliminary report.

This work concerns finitely generated modules over a commutative Gorenstein local ring $R$. It is proved that the minimal free resolution of such a module $M$ is eventually periodic if, and only if, the class of $M$ is torsion in a certain $\mathbb{Z}[t,t^{-1}]$-module associated to $R$. This module, which we denote $J_R(t)$, is a quotient of the free $\mathbb{Z}[t,t^{-1}]$-module on the isomorphism classes of finitely generated $R$-modules by relations reminiscent of those defining the Grothendieck group of $R$. The main result is a structure theorem for $J_R(t)$ when $R$ is a complete Gorenstein local ring; the link between periodicity and torsion stated above is a corollary. As a consequence, a complete Gorenstein local ring has an eventually periodic module if and only if the module $J_R(t)$ has nontrivial torsion. (Received September 09, 2012)