Meeting: 1006, Lubbock, Texas, SS 4A, Special Session on Homological Algebra and Its Applications

1006-13-133 **Lars Winther Christensen*** (winther@math.unl.edu), Department of Mathematics, University of Nebraska-Lincoln, 203 Avery Hall, Lincoln, NE 68588-0130, and **Srikanth Iyengar** (iyengar@math.unl.edu), Department of Mathematics, University of Nebraska-Lincoln, 203 Avery Hall, Lincoln, NE 68588-0130. *Gorenstein dimension of modules finite over homomorphisms.* Preliminary report.

The G–dimension for finitely generated (f.g.) modules over a commutative noetherian local ring R was introduced by M. Auslander and M. Bridger in the late 1960'ies. It is a refinement of the classical projective dimension and obeys the so-called Auslander–Bridger formula:

$$\mathrm{G}-\dim_R M = \mathrm{depth} R - \mathrm{depth}_R M.$$

This formula has been extended to modules that are finite over a local homomorphism: If $\varphi : R \to S$ is a local homomorphism (i.e. mapping the maximal ideal $\mathfrak{m}$ of R into that of S), and M is a f.g. S–module with finite Gorenstein flat dimension over R, then

$$\mathrm{Gfd}_R M = \mathrm{depth} R - \mathrm{depth}_R M.$$

Here the Gorenstein flat dimension is an extension of G–dimension to modules that are not f.g., and the number $\mathrm{depth}_R M$ is the index of the first non-vanishing cohomology module $\mathrm{Ext}^i_R(R/\mathfrak{m}, M)$.

I will outline the proof of this formula and discuss a global version. (Received February 11, 2005)