1009-13-220 **Lars Winther Christensen*** (winther@math.unl.edu), Department of Mathematics, University of Nebraska-Lincoln, 203 Avery Hall, Lincoln, NE 68588-0130, and **Henrik Holm** (holm@imf.au.dk), Department of Mathematics, University of Aarhus, Munkegade Bldg. 530, 8000 Aarhus, Denmark. *Invertibility of evaluation homomorphisms.* Preliminary report.

Let $(R, \mathfrak{m}, k)$ be a commutative noetherian local ring. For finitely generated R–modules L, M, and N the a natural map

$$L \otimes \mathrm{Hom}(M, N) \to \mathrm{Hom}(\mathrm{Hom}(L, M), N)$$

is a bijection of modules, if L is free. More generally, all the maps in homology

$$\theta_n^{LMN} : \mathrm{H}_n(L \otimes^{\mathbf{L}} \mathbf{R}\mathrm{Hom}(M, N) \to \mathrm{H}_n(\mathbf{R}\mathrm{Hom}(\mathbf{R}\mathrm{Hom}(L, M), N))$$

are bijections, if L has a finite free resolution. Thus, if R is regular then

$$\theta_n^{kMk} : \mathrm{H}_n(k \otimes^{\mathbf{L}} \mathbf{R}\mathrm{Hom}(M, k)) \to \mathrm{H}_n(\mathbf{R}\mathrm{Hom}(\mathbf{R}\mathrm{Hom}(k, M), k))$$

is a bijection for all modules M and all integers n.

If the dimension of R is odd, a strong converse holds: If θ_n^{kRk} is bijective for some n, then R is regular. This fails in even dimension; I shall discuss this and related questions. (Received August 16, 2005)