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Luchozar L Avramov* (avramov@math.unl.edu), Department of Mathematics, University of Nebraska, Lincoln, NE 68516. *Bass numbers of local rings: Questions, results, and the whole story in codepth 3*. Preliminary report.

The n th Bass number μ_R^n of a commutative noetherian local ring R with maximal ideal \mathfrak{m} and residue field $k = R/\mathfrak{m}$ is defined to be the rank of the k -vector space $\mathrm{Ext}_R^n(k, R)$. It is known that for $n > \mathrm{depth} R$ all Bass numbers vanish when R is Gorenstein, and that none of them does when R is not Gorenstein. The talk will survey open problems and known results concerning quantitative information on the sequence (μ_R^n) . For rings satisfying $\mathrm{rank}_k(\mathfrak{m}/\mathfrak{m}^2) - \mathrm{depth} R \leq 3$ the sequence will be computed explicitly. The argument will be used as a platform for discussing a variety of general techniques, which may be applied in other cases as well. (Received August 25, 2009)