LOCAL COHOMOLOGY MODULES AND RELATIVE COHEN-MACAULAYNESS

M. MAST ZOHOURI

Department of Mathematics
Payame Noor University
Tehran, 19395-3697, Iran

e-mail: m.mast.zohouri@gmail.com

Abstract

Let $(R, \mathfrak{m})$ denote a commutative Noetherian local ring and let M be a finite R -module. In this paper, we study relative Cohen-Macaulay rings with respect to a proper ideal $\mathfrak{a}$ of R and give some results on such rings in relation with Artinianness, Non-Artinianness of local cohomology modules and Lyubeznik numbers. We also present some related examples to this issue.

Keywords: local cohomology modules, Lyubeznik numbers, Non-Artinian modules, relative Cohen-Macaulayness.

2010 Mathematics Subject Classification: Primary 13D45; Secondary 13C14, 13E10.

REFERENCES

- [1] M.P. Brodmann and R.Y. Sharp, *Local Cohomology: an Algebraic Introduction with Geometric Applications* (Cambridge University Press, Cambridge, 2013).
- [2] CoCoATeam, CoCoA: A system for doing computation in Commutative Algebra, cocoa.dima.unige.it.
- [3] M.T. Dibaei and A. Vahidi, *Artinian and non-Artinian local cohomology modules*, *Canad. Math. Bull.* **54** (2011) 619–629.
doi:10.4153/CMB-2011-042-5
- [4] M.T. Dibaei and S. Yassemi, *Associated primes and cofiniteness of local cohomology modules*, *Manuscripta Math.* **117** (2005) 199–205.
doi:10.1007/s00229-005-0538-5
- [5] M. Eghbali, *On set theoretically and cohomologically complete intersection ideals*, *Canad. Math. Bull.* **57** (2014) 477–484.

- [6] V. Erdogdu and T. Yildirim, *On the cohomological dimension of local cohomology modules*, arXiv:1504.01148v2 [math.AC].
- [7] R. Hartshorne, *Affine duality and cofiniteness*, Invent. Math. **9** (1970) 145–164.
doi:10.1007/BF01404554
- [8] J. Herzog, *Komplex Auflosungen und Dualitat in der Lokalen Algebra*, Habilitationsschrift (Universitat Regensburg, 1970).
- [9] L. Melkersson, *Some applications of a criterion for artinianness of a module*, J. Pure Appl. Algebra **101** (1995) 291–303.
doi:10.1016/0022-4049(94)00059-R
- [10] M. Mast Zohouri, KH. Ahmadi Amoli, and S.O. Faramarzi, *Relative Cohen-Macaulay filtered modules with a view toward relative Cohen-Macaulay modules*, Math. Reports **20** (70), 3 (2018).
- [11] G. Lyubeznik, *Finiteness properties of local cohomological modules (an application of D -modules to Commutative Algebra)*, Invent. Math. **113** (1993) 41–55.
doi:10.1007/BF01244301
- [12] R. Lü and Z. Tang, *The f -depth of an ideal on a module*, Proc. Amer. Math. Soc. **130** (2001) 1905–1912.
doi:10.1090/S0002-9939-01-06269-4
- [13] A. Ooishi, *Matlis duality and the width of a module*, Hiroshima Math. J. **6** (1976) 573–587. projecteuclid.org/euclid.hmj/1206136213.
- [14] M. Rahro Zargar, *Some duality and equivalence results*, arXiv:1308.3071v2 [math.AC].
- [15] A.S. Richardson, *Co-localization, co-support and local cohomology*, Rocky Mountain J. Math. **36** (2006) 1679–1703.
doi:10.1216/rmjm/1181069391
- [16] N. Suzuki, *On the generalized local cohomology and its duality*, J. Math. Kyoto Univ. **18** (1978) 71–85.
doi:10.1215/kjm/1250522630

Received 21 March 2018

Revised 5 July 2018

Accepted 12 July 2018