SEMINARIO DI GEOMETRIA

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The eventual regularity of Tor and Ext modules

Motivated by earlier results on Castelnuovo-Mumford regularity of Tor and Ext modules, more specifically by a question emerging from an article of Ghosh anf Puthenpurakal, we study the eventual behavior of the regularity of the i-th Ext and Tor modules corresponding to a pair of modules, as i grows. We prove that, over a complete intersection ring, the regularity eventually becomes a linear function for i even (resp. i odd) for Ext, while this need not be the case for Tor. In the more delicate case of Tor, we prove that regularity is eventually linear under an additional assumption, but could be very hectic otherwise. The examples of hectic behavior also relates to a question about cohomology and base change in a product of two projective spaces.
Our talk is based on joint work with Dipankar Ghosh and Navid Nemati.