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Frobenius Depth and its Applications

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To consider vanishing of local cohomology modules and in the case R is a local ring containing a field of positive characteristic, Lyubeznik introduced the notion of F-depth R in terms of the Frobenius action on the finitely many local cohomology modules $H_{\mathfrak{m}}^i(R)$. More precisely, F-depth R is the smallest i such that $f^s : H_{\mathfrak{m}}^i(R) \rightarrow H_{\mathfrak{m}}^i(R)$ does not send $H_{\mathfrak{m}}^i(R)$ to zero for any integer $s > 1$. In this talk, after some preliminary result, we compare it with the notion of F-depth defined by Hartshorne and Speiser, quickly. Then, we examined more properties of F-depth. Finally, we compare the F-depth R with some other invariants of local rings for explicit computations.