On the Matlis duals of F-finite modules

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Throughout, let $(R, \mathfrak{m})$ be a Noetherian regular local ring of characteristic $p > 0$ and I a nonzero ideal of R. Let $D(-) = \mathrm{Hom}_R(-, E)$ be the Matlis dual functor, where $E = E_R(R/\mathfrak{m})$ is the injective hull of the residue field $R/\mathfrak{m}$. The theory of F-modules was first recognized by Gennady Lyubeznik in 1997, [1]. Since then it has become a powerful tool which has significant applications to local cohomology and $\mathcal{D}$-module theories and successfully used by many mathematicians.
In this talk, after giving some basic definitions and theorems about F-module theory, we show that the support of the Matlis dual of any F-finite F-module $\mathcal{M}$ with $0 \notin \mathrm{Ass}_R(\mathcal{M})$ is the entire spectrum of R. This talk consists of results from the joint work with Gennady Lyubeznik, [2].

References

[1] G. Lyubeznik, *F-modules: applications to local cohomology and D-modules in characteristic p>0*, J. reine angew. Math. **491** (1997), 65-130.

[2] Gennady Lyubeznik and **T. Yıldırım**, "On The Matlis Duals of Local Cohomology Modules", arXiv:1707.00501 Proc.AMS (to appear).

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