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Monica Lewis* (malewi@umich.edu). *The local cohomology of a parameter ideal with respect to an arbitrary ideal.*

Let R be a regular ring, let J be an ideal generated by a regular sequence of codimension at least 2, and let I be an ideal containing J . We give an example of a module $H_I^3(J)$ with infinitely many associated primes, answering a question of Hochster and Núñez-Betancourt in the negative. In fact, for $i \leq 4$, we show that under suitable hypotheses on R/J , $\text{Ass } H_I^i(J)$ is finite if and only if $\text{Ass } H_I^{i-1}(R/J)$ is finite. Our proof of this statement involves a novel generalization of an isomorphism of Hellus, which may be of some independent interest. The finiteness comparison between $\text{Ass } H_I^i(J)$ and $\text{Ass } H_I^{i-1}(R/J)$ tends to improve as our hypotheses on R/J become more restrictive. To illustrate the extreme end of this phenomenon, at least in the prime characteristic $p > 0$ setting, we show that if R/J is regular, then $\text{Ass } H_I^i(J)$ is finite for all $i \geq 0$. (Received July 31, 2020)