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Taran Hunter Funk* (tfunk2@unl.edu) and **Thomas Marley**. *Frobenius and Homological Dimensions of Complexes*.

It is proved that a module M over a Noetherian local ring R of prime characteristic and positive dimension has finite flat dimension if $\mathrm{Tor}_i^R({}^eR, M) = 0$ for $\dim(R)$ consecutive positive values of i and infinitely many e . Here eR denotes the ring R viewed as an R -module via the e th iteration of the Frobenius endomorphism. In the case R is Cohen-Macaulay, it suffices that the Tor vanishing above holds for a single $e \geq \log_p e(R)$, where $e(R)$ is the multiplicity of the ring. This improves a result of D. Dailey, S. Iyengar, and the second author, Thomas Marley, as well as generalizing a theorem due to C. Miller from finitely generated modules to arbitrary modules. We also show that if R is a complete intersection ring then the vanishing of $\mathrm{Tor}_i^R({}^eR, M)$ for single positive values of i and e is sufficient to imply M has finite flat dimension. This extends a result of L. Avramov and C. Miller. (Received June 06, 2019)