1154-13-864 **Taran H Funk*** (taran.funk@huskers.unl.edu), 203 Avery hall, Lincoln, NE 69599, 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 $\operatorname{Tor}_i^R({}^eR, M) = 0$ 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 eth iteration of the Frobenius endomorphism. In the case R is Cohen-Macualay, 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, 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 $\operatorname{Tor}_i^R({}^eR, M)$ 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 September 11, 2019)