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Divisorial cohomology vanishing on toric varieties

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Motivated by questions related to the derived category of a toric variety, we study the general cohomology vanishing problem for divisorial sheaves on toric varieties. Let X be a toric variety, V a torus invariant subvariety, D a Weil divisor, and $O(D)$ its associated reflexive sheaf of rank one. We give a general account on the combinatorial and number theoretical problems involved when determining the vanishing of the local cohomology groups $H_V^i(X, O(D))$. This includes secondary fans, discriminantal arrangements after Manin and Schechtman, and the diophantic Frobenius problem. In the case $V = X$ and X compact we are able to refine some of the standard vanishing theorems and obtain some novel, “non-standard” vanishing results.
