

1164-13-205

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*Virtual resolutions for smooth toric varieties.*

The minimal free resolution of a graded module encodes many geometric properties of the corresponding sheaf on projective space. However, when the ambient space is a product of projective spaces or a more general smooth projective toric variety  $X$ , minimal free resolutions over the Cox ring are too long and contain many geometrically superfluous summands. In joint work with Daniel Erman and Gregory G. Smith, we propose considering instead virtual resolutions, which more closely reflect the geometry of sheaves on  $X$ . We will survey recent results which build this case. (Received January 18, 2021)