

1030-13-245

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([tchernev@math.albany.edu](mailto:tchernev@math.albany.edu)). *Multigraded modules and the topology of representable matroids*. Preliminary report.

Let  $R = \mathbb{k}[x_1, \dots, x_m]$  be a polynomial ring over a field  $\mathbb{k}$  with the standard  $\mathbb{Z}^m$ -grading (multigrading), let  $\Phi : E \rightarrow G$  be a multihomogeneous free presentation of a multigraded Noetherian  $R$ -module  $L$ , and let  $S$  be a multihomogeneous basis of  $E$ . In recent work the second author has used this data to give an explicit construction of a multigraded free resolution (the *T-resolution*)  $T_\bullet(\Phi, S)$  of the module  $L$  that extends the map  $\Phi$ . The components of this T-resolution are directly obtained from a family of  $\mathbb{k}$ -vector spaces (the *T-spaces*)  $T_A$ , where the index  $A$  is a subset of  $S$  and ranges through the so-called T-flats of the matroid  $\mathbf{M}$  represented by  $\Phi$  over  $\mathbb{k}$ .

The first author has shown in her thesis that by choosing a linear ordering on the elements of the set  $S$ , one can construct a canonical isomorphism from the only nonzero reduced homology of the reduced broken circuit complex  $\overline{BC}((\mathbf{M}|A)^*)$  to the T-space  $T_A$ . In this talk we will discuss to what extent are the differentials of the T-resolution of the  $R$ -module  $L$  determined by the topology of these reduced broken circuit complexes. (Received August 04, 2007)