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Unique sets of graded Betti numbers and forbidden cancellations

If one knows the graded Betti numbers of a module, one can compute the Hilbert function. However, given a Hilbert function, there may be many possible sets of graded Betti numbers that occur for modules with that Hilbert function. In certain cases, the Hilbert function uniquely determines the set of graded Betti numbers, but characterizing when that happens is difficult. We will survey some work in this area, including some useful tools introduced to identify when potential resolutions cannot occur, and we will pose some open questions.