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   Nota di contenuto Front matter -- Contents -- Chapter 1. Some useful classes of modules
                      -- Chapter 2. Approximations of modules -- Chapter 3. Complete
                      cotorsion pairs -- Chapter 4. Deconstruction of cotorsion pairs --
                      Chapter 5. Tilting approximations -- Chapter 6. 1-tilting modules and
                      their applications -- Chapter 7. Tilting approximations and the finitistic
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                      The Black Box and its relatives -- Chapter 10. Independence results for
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                      Modules with distinguished submodules -- Chapter 15. Some useful
                      classes of algebras -- Backmatter

   Sommario/riassunto The category of all modules over a general associative ring is too
                      complex to admit any reasonable classification. Thus, unless the ring is
                      of finite representation type, one must limit attempts at classification
                      to some restricted subcategories of modules. The wild character of the

category of all modules, or of one of its subcategories C is often indicated by the presence of a realization theorem, that is, by the fact that any reasonable algebra is isomorphic to the endomorphism algebra of a module from C. This results in the existence of pathological direct sum decompositions and these are generally viewed as obstacles to the classification. Realization theorems have thus become important indicators of the non-classification theory of modules. In order to overcome this problem, approximation theory of modules has been developed over the past few decades. The idea here is to select suitable subcategories C whose modules can be classified, and then to approximate arbitrary modules by ones from C. These approximations are neither unique nor functorial in general, but there is always a rich supply available appropriate to the requirements of various particular applications. Thus approximation theory has developed into an important part of the classification theory of modules. In this monograph the two methods are brought together. First the approximation theory of modules is developed and some of its recent applications, notably to infinite dimensional tilting theory, are presented. Then some prediction principles from set theory are introduced and these become the principal tools in the establishment of appropriate realization theorems. The monograph starts from basic facts and gradually develops the theory towards its present frontiers. It is suitable both for graduate students interested in algebra and for experts in module and representation theory.