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An approach to extending and lifting modules by modular lattices. (English) Zbl 0998.16004
Indian J. Pure Appl. Math. 33, No. 1, 81-86 (2002).

The aim of this paper is twofold: first, to place a module-theoretical result on extending modules into a latticial setting, and second, by applying this lattice-theoretical result to the dual lattice of the lattice of all submodules of a module, to obtain a result on lifting modules. More precisely, the following result is proved. Let M be right module over an associative ring with identity element which is the direct sum of two submodules M_1 and M_2 . Then M is a lifting module if and only if M is amply supplemented and every coclosed submodule N of M with $M = N + M_1$ and $M = N + M_2$ is a direct summand of M . As a consequence, it follows that if a module M is a direct sum of finitely many relatively projective modules M_i , $i = 1, \dots, n$, then M is a lifting module if and only if M is amply supplemented and each M_i is lifting.

Reviewer: [Toma Albu \(Ankara\)](#)

MSC:

- [16D70](#) Structure and classification for modules, bimodules and ideals (except as in 16Gxx), direct sum decomposition and cancellation in associative algebras)
- [06C05](#) Modular lattices, Desarguesian lattices
- [16D80](#) Other classes of modules and ideals in associative algebras
- [16D40](#) Free, projective, and flat modules and ideals in associative algebras

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Keywords:

modular lattices; lattices of submodules; extending modules; lifting modules; direct sums; amply supplemented modules; coclosed submodules; direct summands; relatively projective modules