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On weakly projective and weakly injective modules

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Abstract: The purpose of this paper is to further the study of weakly injective and weakly projective modules as a generalization of injective and projective modules. For a locally q.f.d. module M , there exists a module $K \in \sigma[M]$ such that $K \oplus N$ is weakly injective in $\sigma[M]$, for any $N \in \sigma[M]$. Similarly, if M is projective and right perfect in $\sigma[M]$, then there exists a module $K \in \sigma[M]$ such that $K \oplus N$ is weakly projective in $\sigma[M]$, for any $N \in \sigma[M]$. Consequently, over a right perfect ring every module is a direct summand of a weakly projective module. For some classes \mathcal{M} of modules in $\sigma[M]$, we study when direct sums of modules from \mathcal{M} satisfy property \mathbb{P} in $\sigma[M]$. In particular, we get characterizations of locally countably thick modules, a generalization of locally q.f.d. modules.

Keywords: tight, weakly tight, weakly injective, weakly projective, countably thick, locally q.f.d., weakly semisimple

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