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Some results on (n, d)-injective modules, (n, d)-flat modules and n-coherent rings

Abstract: Let n, d be two non-negative integers. A left R-module M is called (n, d)-injective, if $\text{Ext}^{d+1}(N, M) = 0$ for every n-presented left R-module N. A right R-module V is called (n, d)-flat, if $\text{Tor}_{d+1}(V, N) = 0$ for every n-presented left R-module N. A left R-module M is called weakly n-FP-injective, if $\text{Ext}^n(N, M) = 0$ for every $(n + 1)$-presented left R-module N. A right R-module V is called weakly n-flat, if $\text{Tor}_n(V, N) = 0$ for every $(n+1)$-presented left R-module N. In this paper, we give some characterizations and properties of (n, d)-injective modules and (n, d)-flat modules in the cases of $n \geq d+1$ or $n > d + 1$. Using the concepts of weakly n-FP-injectivity and weakly n-flatness of modules, we give some new characterizations of left n-coherent rings.

References

[1] Chen J.L., Ding N.Q., *On n-coherent rings*, Comm. Algebra **24** (1996), 3211–3216.
[2] D.L. Costa, *Parameterizing families of non-noetherian rings*, Comm. Algebra **22** (1994), no. 10, 3997–4011.
[3] Enochs E.E., Jenda O.M.G., *Relative Homological Algebra*, Walter de Gruyter, Berlin-New York, 2000.
[4] Holm H., Jørgensen P., *Covers, precovers, and purity*, Illinois J. Math. **52** (2008), 691–703.
[5] Megibben C., *Absolutely pure modules*, Proc. Amer.Math. Soc. **26** (1970), 561–566.
[6] Rada J., Saorin M., *Rings characterized by (pre)envelopes and (pre)covers of their modules*, Comm. Algebra **26** (1998), 899–912.
[7] Stenström B., *Coherent rings and FP-injective modules*, J. London Math. Soc. **2** (1970), 323–329.
[8] Zhou D.X., *On n-coherent rings and (n, d)-rings*, Comm. Algebra **32** (2004), 2425–2441.
[9] Zhu Z., *On n-coherent rings, n-hereditary rings and n-regular rings*, Bull. Iranian Math. Soc. **37** (2011), 251–267.