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Relative weak derived functors

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Abstract: Let R be a ring, n a fixed non-negative integer, $\mathcal{W}\mathcal{I}$ the class of all left R -modules with weak injective dimension at most n , and $\mathcal{W}\mathcal{F}$ the class of all right R -modules with weak flat dimension at most n . Using left (right) $\mathcal{W}\mathcal{I}$ -resolutions and the left derived functors of Hom we study the weak injective dimensions of modules and rings. Also we prove that $-\otimes-$ is right balanced on $\mathcal{M}_R \times {}_R\mathcal{M}$ by $\mathcal{W}\mathcal{F} \times \mathcal{W}\mathcal{I}$, and investigate the global right $\mathcal{W}\mathcal{I}$ -dimension of ${}_R\mathcal{M}$ by right derived functors of \otimes .

Keywords: weak injective module; weak flat module; weak injective dimension; weak flat dimension

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