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Homotopy categories and idempotent completeness, weight structures and weight complex functors

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This article provides some basic results on weight structures, weight complex functors and homotopy categories. We prove that the full subcategories $K(A)^{w < n}$, $K(A)^{w > n}$, $K(A)^-$ and $K(A)^+$ (of objects isomorphic to suitably bounded complexes) of the homotopy category $K(A)$ of an additive category A are idempotent complete, which confirms that $(K(A)^{w <= 0}, K(A)^{w >= 0})$ is a weight structure on $K(A)$. We discuss weight complex functors and provide full details of an argument sketched by M. Bondarko, which shows that if w is a bounded weight structure on a triangulated category T that has a filtered triangulated enhancement T' then there exists a strong weight complex functor $T \to K(heart(w))^{anti}$. Surprisingly, in order to carry out the proof, we need to impose an additional axiom on the filtered triangulated category T' which seems to be new.

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