

ON DETERMINANT FUNCTORS AND K -THEORY

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Abstract: We extend Deligne’s notion of determinant functor to Waldhausen categories and (strongly) triangulated categories. We construct explicit universal determinant functors in each case, whose target is an algebraic model for the 1-type of the corresponding K -theory spectrum. As applications, we answer open questions by Malsiniotis and Neeman on the K -theory of (strongly) triangulated categories and a question of Grothendieck to Knudsen on determinant functors. We also prove additivity theorems for low-dimensional K -theory of (strongly) triangulated categories and obtain generators and (some) relations for various K_1 -groups. This is achieved via a unified theory of determinant functors which can be applied in further contexts, such as derivators.

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Key words: Determinant functor, K -theory, exact category, Waldhausen category, triangulated category, Grothendieck derivator.