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Title: Vector bundles and tight closure

Abstract: We introduce vector bundles on smooth projective curves, in particular the notion of semi-stability and its variant in positive characteristic, strong semi-stability. We explain how these notions provide tools to study questions from Hilbert-Kunz-theory and tight closure in the corresponding two-dimensional homogeneous coordinate rings. In particular we will discuss rationality of Hilbert-Kunz multiplicity, relation between tight closure and plus closure, behaviour under change of prime numbers and the localization problem. Time permitting, we will also mention typical new problems arising in higher dimension.