NONCOMMUTATIVE INTEGRAL FORMS AND DIFFERENTIAL SMOOTHNESS REVISITED

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In the context of supergeometry, integral forms were introduced by Yu. I. Manin in the 1980s and discussed in his book "Gauge Field Theory and Complex Geometry", Springer 1988. The notion was extended to noncommutative geometry in our joint paper with Laiachi El Kaoutit and Christian Lomp, "Noncommutative integral forms and twisted multi-derivations", J. Noncommut. Geom. 4 (2010), 281-312. Noncommutative integral forms then served as a key component of the concept of differential smoothness of noncommutative spaces formulated jointly with Andrzej Sitarz in "Smooth geometry of the noncommutative pillow, cones and lens spaces" J. Noncommut. Geom. 11 (2017), 413-439. In the talk I will review these concepts and discuss recent progress in studying differential smoothness, possible further developments as well as main obstacles which should be overcome should one wish to make differential smoothness an effective tool for revealing properties of noncommutative algebras.