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Deformation quantization. (English) [Zbl 0854.58026](#)

Séminaire Bourbaki. Volume 1993/94. Exposés 775-789. Paris: Société Mathématique de France, Astérisque. 227, 389-409 (Exp. No. 789) (1995).

This paper is a succinct and high level review of the theory of deformation quantization. The origin of this idea can be traced back to Dirac. Dirac discussed the analogies between the classical Poisson bracket and quantum commutators as an example of the “correspondence principle” between classical and quantum systems. One mathematical realization of this correspondence principle is the construction of a family of algebras A_i , $i \in \mathbb{R}$, deforming the algebra A_0 of classical observables. This program has been developed extensively by Lichnerowicz and his collaborators in the late 70s. The aim of this program is to develop quantum mechanics in terms of deformation of the algebra of smooth functions on the classical phase space without using the usual Hilbert space representations. This leads, in particular, to the notion of Poisson manifolds and $*$ -products generalizing the Moyal-Weyl product on \mathbb{R}^{2n} . Global quantization of an arbitrary Poisson manifold by patching together local Moyal-Weyl products or otherwise involves obstructions leading to the study of Hochschild cohomology. In special cases the existence of deformation quantization has been demonstrated. A brief discussion of the classification of $*$ -products is also given.

For the entire collection see [\[Zbl 0811.00012\]](#).

Reviewer: [K.Marathe \(Brooklyn\)](#)

MSC:

[53D50](#) Geometric quantization

[81S10](#) Geometry and quantization, symplectic methods

Cited in 14 Documents

Keywords:

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