

Coherent state map in quantization

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Abstract

The coherent state map $\mathcal{K} : M \rightarrow \mathbb{C}\mathbb{P}(\mathcal{H})$ by definition is a symplectic map of the symplectic manifold (M, ω) into the complex projective Hilbert space $\mathbb{C}\mathbb{P}(\mathcal{H})$ with the Fubini-Study form ω_{FS} as the symplectic form. Since $\mathbb{C}\mathbb{P}(\mathcal{H})$ is the phase space of the pure state of the quantum system, one can consider $\mathcal{K} : M \rightarrow \mathbb{C}\mathbb{P}(\mathcal{H})$ as the quantization of the elements $p \in M$ of the classical phase space M .

We will show that using $\mathcal{K} : M \rightarrow \mathbb{C}\mathbb{P}(\mathcal{H})$ one can also quantize classical observables. This quantization method is related to Kostant-Souriau geometric quantization as well as to the $*$ -product quantization.

Finally we will present some examples in order to illustrate the coherent state method of quantization.