

Title: Quantization in Cartesian coordinates and the Hofer metric

Abstract: We address a statement by Dirac, which points out an obvious but disturbing fact: the canonical quantization of a system is carried out best if the Hamiltonian and the canonical commutation relations are expressed in cartesian coordinates. This is disturbing as coordinates have no intrinsic meaning in Physics, in general, hence no coordinate system should be favoured in making physical predictions, apart of the relative ease of performing actual calculations.

We claim that a possible reason for the special role of the Cartesian coordinates in canonical quantisation is the uniqueness of the Hofer metric on the space of Hamiltonian diffeomorphisms of the underlying phase space.