

## Abstract

An interpretation of the locality principle in renormalization is that a locality property is preserved in the process of renormalization. We establish such a principle in the framework of the algebraic approach of Connes and Kreimer to quantum field renormalization, by working with their algebraic Birkhoff factorization. More precisely we show that if a regularization map is a locality map, then so is the corresponding renormalization map from the algebraic Birkhoff factorization. For this purpose, we introduce locality for various algebraic structures including those of a Hopf algebra, a Rota-Baxter algebra and a regularization map between the two algebras. As an application in the context of the Euler-Maclaurin formula on lattice cones, we renormalize the exponential generating function which sums over the lattice points in a lattice cone.