

The problem whether scale invariance implies full conformal invariance, for special relativistic classical field theories, was resolved in the literature by exploiting the Weyl and diffeomorphic symmetries held simultaneously by the suitably improved corresponding theories. In a recent study it was conjectured that, for Liouville field theory, the case is different, as such theory could not have both symmetries (Weyl and diffeomorphic) at once. In this thesis we investigate that conjecture. In the first part the conformal symmetry, and the associated Witt and Virasoro algebras, are revised. Next, we review the relationship between scale and conformal invariance, using the approach of Weyl and Ricci gauging. The last part is devoted to the Liouville field theory. We prove there the incompatibility of Weyl and diffeomorphic invariance, by showing that the particular choice of the Weyl potential, necessary to have traceless energy-momentum tensor, gives rise to an action that is not a scalar under diffeomorphisms. A preliminary study of this “classical gravitational anomaly” is also performed.