

On the global Hadamard parametrix in QFT and the signed squared geodesic distance defined in domains larger than convex normal neighbourhoods

Thursday, 31 August 2023 11:50 (1 hour)

We consider the global Hadamard condition and the notion of Hadamard parametrix whose use is pervasive in algebraic QFT in curved spacetime (see references in the main text). We point out the existence of a technical problem in the literature concerning well-definedness of the global Hadamard parametrix in normal neighbourhoods of Cauchy surfaces. We discuss in particular the definition of the (signed) geodesic distance and related structures in an open neighbourhood of the diagonal of larger than $U \times U$, for a normal convex neighbourhood U , where (M, g) is a Riemannian or Lorentzian (smooth Hausdorff paracompact) manifold. We eventually propose a quite natural solution which slightly changes the original definition by Kay and Wald and relies upon some non-trivial consequences of the paracompactness property. The proposed re-formulation is in agreement with Radzikowski's microlocal version of the Hadamard condition.

(From Letters in Mathematical Physics volume 111, Article number: 130 (2021))

Primary author: MORETTI, Valter (University of Trento)

Presenter: MORETTI, Valter (University of Trento)

Session Classification: Morning session 2