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Regularity conditions at spatial infinity revisited

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H. Friedrich has shown that if one considers a time symmetric initial data set for the Einstein vacuum equations admitting an analytic compactification at infinity, then necessary conditions for the solutions to the transport system implied by the conformal Einstein equations at the cylinder at spatial infinity to extend smoothly to the critical sets where null infinity touches spatial infinity is that the Cotton-Bach tensor of the conformal metric, and its trace-free symmetrised higher order derivatives vanish at spatial infinity.

In this talk the generalisation of this regularity condition to data with non-vanishing second fundamental forms is examined. It is discussed how these regularity conditions can be phrased in terms of the vanishing at infinity of a pair of tensors and their higher order symmetrised derivatives. It is shown that these “generalised regularity conditions” are only a restriction on the freely specifiable data. The relation of these “generalised regularity conditions” to stationary data is considered. Finally, it is also discussed how these regularity conditions can be used to construct purely radiative data at “past null infinity”.

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