Contribution Title:	A RIGIDITY PROPERTY OF THE DEVELOPMENT OF CONFORMALLY FLAT DATA IN GENERAL RELATIVITY
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There is available a regular finite initial value problem for the conformal Einstein field equations which is obtained by using the propagation equations implied by the conformal Einstein field equation in a particular conformal gauge. This conformal gauge is based on certain conformal invariants (conformal geodesics) and renders a finite representation of the conformal boundary of the spacetime, where its location is known a priori. Given a time symmetric initial data set for the vacuum Einstein field equations which is conformally flat in a neighbourhood of null infinity, I use this regular initial value problem to show that its solutions extend smoothly through the sets where null infinity "touches" spatial infinity if and only if the initial data coincides with data which is exactly Schwarzschild in a neighbourhood of infinity. The relevance of this result is put in context by noticing that the Schwarzschild spacetime is the only vacuum spacetime with conformally flat hypersurfaces. The main result is obtained from a careful analysis of the algebraic structure of the solutions of certain transport equations implied by the restriction of the conformal Einstein field equations to the "cylinder at spatial infinity" – a total characteristic hypersurface which arises in this conformal representation of the spacetime. Possible generalisations of this result to initial data sets which are neither conformally flat nor time symmetric are discussed.

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