Global existence of classical solutions to the Goursat problem for quasilinear hyperbolic systems with small BV data

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Abstract: We investigate the existence of a global classical solution to the Goursat problem for linearly degenerate quasilinear hyperbolic systems. As the result in [A. Bressan, Contractive metrics for nonlinear hyperbolic systems, Indiana Univ. Math. J. 37 (1988) 409-421] suggests that one may achieve global smoothness even if the C^1 norm of the initial data is large, we prove that, if the C^1 norm of the boundary data is bounded but possibly large, and the BV norm of the boundary data is sufficiently small, then the solution remains C^1 globally in time. Applications include the equation of time-like extremal surfaces in Minkowski space $R^{1+(1+n)}$.

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