Piecewise regular solutions with one shock to a generalised Burgers-Hilbert equation

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Abstract

A local existence and uniqueness result for a quasilinear scalar balance law with a singular source term of convolution type is shown. Since the solution exhibits a spatial shock (discontinuity), we first shift the coordinate system so that the shock is always located at the origin. Next, we make the ansatz that the solution equals the sum of a discontinuous function with a bounded derivative (the regular part) and a continuous function with an unbounded derivative (the corrector term). Then, to build a sequence of approximate solutions, the method of the backward characteristics is exploited; here, careful upper estimates of the terms involved are required. Finally, the convergence of the approximating sequence in a suitable norm to the solution to the original equation is proved. This is joint work with Lorena Bociu, Evangelia Ftaka, and Khai Tien Nguyen (North Carolina State University).