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Nonlinear Geometrical Optics for Shock Waves

This talk is devoted to the asymptotic analysis and rigorous justification of the nonlinear geometrical optics for shock waves of hyperbolic conservation laws in one space variable. The existence and asymptotic properties of highly oscillatory shock waves are established by studying Goursat problems of free boundaries. We obtain that the principal profiles of the oscillatory shock waves satisfy nonlinear integro-differential systems. Furthermore, it is observed that the leading terms of shock fronts don't oscillate, and oscillations only appear in the leading terms of shock speeds.