

Title : A characteristic boundary-value problem

Abstract : We consider the Dirichlet boundary-value problem for the second order PDE

$$(2u + |\nabla u|^2)\Delta u - D^2u : \nabla u \otimes \nabla u + 4u + |\nabla u|^2 = 0.$$

This equation has (at least) two meanings. One comes from differential geometry and the other from gas dynamics with a Chaplygin (or von Kármán) equation of state. It has two regimes, hyperbolic (if $u < 0$) or elliptic (if $u > 0$). Both yield interesting analyses.