

Nonlinear Partial Differential Equations of Mixed Elliptic-Hyperbolic Type

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Abstract. Many nonlinear partial differential equations arising in mechanics and geometry naturally are of mixed hyperbolic-elliptic type. The solution of some fundamental issues in these areas greatly requires a deep understanding of such nonlinear partial differential equations of mixed type. Important examples include transonic flow equations in fluid mechanics and the Gauss-Codazzi system for isometric embedding in differential geometry. In this talk we will discuss some recent developments in the analysis of nonlinear partial differential equations of mixed type through these examples with emphasis on identifying/developing mathematical approaches, ideas, and techniques to deal with the mixed-type problems. Further trends, perspectives, and open problems in this direction will also be addressed.