

On the Hamiltonian 1st order PDE systems

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What does it mean that some system is hamiltonian? Is it useful to know? Indeed, the property of system to be hamiltonian is sometimes very important. Every system can be presented as subsystem or factor-system of the hamiltonian one, so we should not mix up our question with such constructions. Since XIX Century people studied first order PDE systems. They appeared in hydrodynamics. However, the hamiltonian theory was constructed for them only in 1980s as a by-product of the Theory of Solitons. It is enormously useful for the solution of the asymptotic problems of this theory– in particular for the understanding of the “dispersive analog of shock waves” and other related problems where the so-called “Nonlinear Analog of WKB approximation” is needed.