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Walter Craig* (craig@math.mcmaster.ca), Department of Mathematics & Statistics, McMaster University, 1280 Main Street West, Hamilton, Ontario L8S 4K1, Canada. *Birkhoff normal form for nonlinear wave equations.*

Wave equations can be considered as Hamiltonian PDEs, that is, partial differential equations that can be considered in the form of a Hamiltonian system. Many theorems on global existence of small amplitude solutions of nonlinear wave equations in \mathbb{R}^n depend upon a competition between the time decay of solutions and the degree of the nonlinearity. Decay estimates are more effective when inessential nonlinear terms are able to be removed through a well-chosen transformation. In this talk, we construct Birkhoff normal forms transformations for the class of wave equations which are Hamiltonian PDEs and null forms, giving a new proof via canonical transformations of the global existence theorems for null form wave equations of S. Klainerman and J. Shatah in space dimensions $n \geq 3$. The critical case $n = 2$ is also under consideration. These results are work in collaboration with A. French and C.-R. Yang (Received September 19, 2016)