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**Walter Craig, Amanda French\*** (afrench@math.mcmaster.ca) and **Chi-Ru Yang**. *Canonical Transformations of Null Forms*. Preliminary report.

The nonlinear wave equation

$$\square u = F(u, u', u'') \tag{1}$$

in  $\mathbb{R}^{n+1}$ ,  $n \geq 3$ , was shown by Klainerman to have a small-data global solution when  $F$  satisfies the so-called *null condition*, which imposes an algebraic cancellation on nonlinearities in the direction of the light cone. We examine scalar Hamiltonian null forms from the perspective of Birkhoff normal form transformations, producing a canonical transformation  $\tau$  which removes the quadratic terms from the Hamiltonian of (1). This enables us to reproduce the results of Klainerman, but also clarifies the relationship between the null condition and three-wave resonance, preserves the Hamiltonian structure of the problem, and establishes a formalism that holds the potential to extend the existing body of results on null forms. (Received September 15, 2014)