1104-35-207 **John A Helms*** (john.helms@gmail.com), Department of Mathematics, South Hall, Room 6607, University of California, Santa Barbara, CA 931063080, and **Thomas Sideris**, Department of Mathematics, South Hall, Room 6607, University of California, Santa Barbara, CA 931063080.
Global solutions to 2-D quasilinear wave equations. Preliminary report.

This work is in joint collaboration with Professor Thomas Sideris (UCSB). We consider small-data solutions to equations of the form

$$\begin{cases} \Box u(t,x) = Q(\partial u, \partial^2 u), & (t,x) \in \mathbb{R}_+ \times \mathbb{R}^2, \\ u(0,x) = \epsilon f(x), \quad \partial_t u(0,x) = \epsilon g(x), \end{cases}$$

where $\Box = \partial_t^2 - \Delta$ and the nonlinearity Q is allowed to depend on ∂u and $\partial^2 u$ at the quadratic level and higher. We also assume that Q is linear in $\partial^2 u$ and that Q satisfies a null condition, which is due to Christodoulou and Klainerman. Alinhac proved global existence of small-data solutions with smooth, compactly supported data (f, g) by using a "Ghost weight" in his main energy estimate. Our proof extends Alinhac's result by allowing for a weaker hypothesis on the initial data: (f, g) are only required to have a certain amount of weighted Sobolev regularity with no restrictions on the support. Our proof also eliminates the use of the Lorentz boosts $x_i\partial_t + t\partial_i$ $(i = 1, 2)$ from the existence argument. If time permits, I will also discuss some difficulties present in this problem and some possible follow-up projects. (Received September 01, 2014)