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Towards a classification of quasi-linear Bäcklund transformations of wavelike PDEs, and a new example. Preliminary report.

We consider the problem of classifying Bäcklund transformations between hyperbolic Monge-Ampère equations with the following properties:

1. The underlying equations are *wavelike* and *translation-invariant*; i.e., of the form

$$u_{xy} = f(u, u_x, u_y), \quad v_{xy} = g(v, v_x, v_y).$$

2. The transformation is *quasi-linear*, which implies that it can be written in the form

$$u_x = F_1(u, v)v_x + F_0(u, v), \quad v_y = G_1(u, v)u_y + G_0(u, v).$$

These conditions lead to an overdetermined PDE system for the functions F_0, F_1, G_0, G_1 whose analysis is quite complicated.

In the process of conducting this analysis, we have found what appears to be a new example of a PDE possessing a 1-parameter family of auto-Bäcklund transformations (i.e., transformations between solutions of the same PDE). We will present this example and explore the question of whether it has additional features typically associated with integrable systems. (Received January 13, 2017)