

Applications of Ribaucour Transformations to a class of PDEs

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Ribaucour transformations for linear Weingarten surfaces in space forms will be considered. The permutability theorem for such transformations will be proved. These geometric results will be applied to a class of partial differential equations, whose solutions characterize the linear Weingarten surfaces in space forms. This is a class of seven equations that includes the sine-Gordon equation, the elliptic sinh-Gordon, the elliptic cosh-Gordon, the Liouville and the Laplace equations. Given a solution of such a differential equation, the geometric Ribaucour transformation, generates a Bäcklund type transformation, which is an integrable system, that provides families of new solutions of the same differential equation. The permutability property provides superposition formulae which give new solutions algebraically. Explicit examples will be included.