Partial differential equations: From zero integrals to exact solutions and Bäcklund transforms

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Abstract. Solving of nonlinear partial differential equations (PDEs) for functions of two independent variables is reduced to solving of a system of two linear PDEs of the first order for zero integrals which implicitly define unknown functions and their derivatives entering these equations. Using the example of the S-Gordon equation, it is shown that this approach is universal in the sense that it can be equally used both to solve analytically the original PDEs and to find Bäcklund transforms.

Keywords: zero integrals, nonlinear partial differential equations, Bäcklund transforms
MSC numbers: 35A20, 35A30

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