Univalent Pairs of Solutions of Elliptic Equations

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We discuss joint work with G. Alessandrini. Main focus will be the description of generalization of a classical theorem of Radò concerning the following issue. Given a pair of harmonic functions u^1, u^2 in a bounded open set Ω in the plane, establish sufficient conditions for the mapping $U = (u^1, u^2) : \Omega \to \mathbf{R}^2$ to be univalent. We give various extensions to the case when the Laplace operator is replaced by a uniformly elliptic one with some applications.