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S. Beheshti* (s.beheshti@qmul.ac.uk), School of Mathematics, Queen Mary University of London, Mile End Road, London, E1 4NS, United Kingdom, and **S. Tahvildar-Zadeh**. *Harmonic Maps, the Xanthopoulos Conjecture and Analysis of Singularities in General Relativity*.

Integrability and dressing techniques have been extensively utilized in the construction and analysis of exact solutions to the Einstein's Equations. On the other hand, harmonic maps have provided deep insight into important mathematical and physical problems, ranging from classical differential geometry to supergravity.

Joint work with S. Tahvildar-Zadeh answers the question “when is a harmonic map integrable?” for a class of mappings having noncompact symmetric space targets. The framework includes application of control-theory techniques to a generalized solution-generating mechanism. This gives rise to surprising new evidence for existence—and possible non-existence—of certain singular configurations for solutions to Einstein's Equations. In conjunction with previous work on compact targets by Uhlenbeck and Terng, the techniques also suggest the first inroads in answering the Xanthopoulos Conjecture. (Received February 08, 2015)