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Jeff A Viaclovsky* (jeffv@math.wisc.edu), Department of Mathematics, University of Wisconsin, Madison, WI 53706. *Moduli spaces and gluing.*

Geometers are interested in the problem of finding a “best” metric on a manifold. In dimension 2, the best metric is usually one which possesses the most symmetries, such as the round metric on a sphere, or a flat metric on a torus. In higher dimensions, there are many classes of geometrically interesting “best” metrics, such as Einstein metrics, metrics with special holonomy, and extremal Kähler metrics, to name a few. One technique for finding new examples of such metrics is a procedure called “gluing”, in which one takes known solutions on two different manifolds, attaches them together using some kind of surgery to obtain an “approximate” solution on a new manifold, and then attempts to perturb to an exact solution of the equations on the new manifold. There are obstructions to carrying this out in practice, which can be understood using a fancy version of the implicit function theorem. Gluing techniques are a valuable tool in studying moduli spaces of solutions, because they give an understanding of how solutions can degenerate. I will describe some well-known examples of moduli spaces and gluing techniques, and then discuss some of my work in this area regarding critical metrics on four-manifolds. (Received February 12, 2016)