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Ye Lu* (y1u4@nd.edu), 255 Hurley BLD, Notre Dame, IN 46556, **Andrew J Sommese** (sommese@nd.edu), 255 Hurley BLD, Notre Dame, IN 46556, **Charles W Wampler** (Charles.W.Wampler@gm.com), 480-106-359, 30500 Mound Road, MI, MI 48090, and **Daniel J Bates** (Bates.17@nd.edu), 255 Hurley BLD, Notre Dame, IN 46556. *Finding All Real Solutions of Polynomial Systems.*

We are interested in describing the set of real solutions of a system of polynomials on C^N with real coefficients. Recently, new techniques have been successfully developed to numerically decompose complex solutions into irreducible components by Sommese, Verschelde and Wampler. With the help of this decomposition, the technique of deflation and a Morse-theoretic decomposition, we give an algorithm for numerically computing the real solution set. Some examples of the use of the algorithm will be presented. (Received August 17, 2005)