1089-14-303   **Dan Bates**, Fort Collins, CO, **Brent Davis**, Fort Collins, CO, **David Eklund**, Fort Collins, CO, **Eric Hanson*** (`hanson@math.colostate.edu`), Fort Collins, CO , and **Chris Peterson**, Fort Collins, CO. *Perturbed Regeneration homotopies for finding all isolated solutions to a polynomial system.*

Homotopy continuation methods provide a way to approximate solutions to polynomial systems. Regeneration is a recent development that uses a linear product decomposition to create a series of homotopies which approximate the nonsingular isolated solutions of a polynomial system. This series of homotopies is in many cases more computationally efficient than other existing homotopy methods, however isolated singular solutions might not be found. We provide a hybrid technique, Perturbed Regeneration, that takes advantage of the efficiency of Regeneration homotopies for finding nonsingular isolated solutions of general systems, but still allows for the approximation of singular isolated solutions. (Received February 18, 2013)