1060-34-106 **J.B. van den Berg**, **J.D. Mireles James**, **J.-P. Lessard*** (lessard@math.rutgers.edu) and **K. Mischaikow**. *Rigorous Computations of Connecting Orbits for Flows. Part II: Contraction mapping, Radii polynomials and the Gray-Scott equation.*

We discuss a numerical scheme which leads to computer assisted proof of existence of connecting orbits for ordinary differential equations. The problem is formulated as a finite time boundary value problem by exploiting a high-order parameterization of the invariant manifolds at the equilibria. The boundary value problem is solved numerically via piecewise linear approximations and a Newton Scheme. We construct an operator on a function space whose unique fixed point corresponds to the desired connecting orbit, and rigorously establish that the operator is a contraction mapping in some neighborhood of the numerical solution. The verification of the contraction is done with the use of the so-called radii polynomials. In part II, we focus on the contraction mapping, the radii polynomials and we apply the method to prove existence of even homoclinics for the Gray-Scott equation. (Received March 24, 2010)