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Emily Schaal* (eeschaal@email.wm.edu), PO 8793, Williamsburg, VA 23187, and **Yu-Min Chung** (ychung@wm.edu), 200 Ukrop Way, Williamsburg, VA 23187. *Center Manifolds via Lyapunov-Perron*. Preliminary report.

The Lyapunov-Perron (L-P) operator is a theoretical method used to show the existence of the invariant manifold. In 2005, M.S. Jolly and R. Rosa presented an algorithm for solving systems with center manifolds based on discretizing the L-P operator. However, this discretization can be expensive to implement. We provide detailed proofs of the construction of the center manifold and its derivative by the L-P operator under the Jolly-Rosa framework. We present an algorithm based on a boundary value formulation of the operator. Importantly, the algorithm is simple and can be adopted by any generic scheme. We implement the algorithm, test it with a simple ODE example, and then test it by performing a center manifold reduction on a quasilinear elliptic PDE. We perform a bifurcation analysis on the full equation and compare it to the bifurcation analysis of the reduced equation. (Received January 23, 2017)