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Title: “*Continuation and bifurcations of Halo orbits - computer-assisted proof*”

Abstract. We propose an algorithm for rigorous validation that a family of periodic orbits preserving some symmetries undergoes various types of bifurcations, including period doubling and tripling. We apply the method to the Restricted Circular Three Body Problem, giving a computer-assisted proof that the family of Halo orbits bifurcates from the family of Lyapunov orbits for wide range of the parameters μ . For μ corresponding to the Sun-Jupiter system we give a proof of the existence of a wide continuous branch of Halo orbits that undergoes period doubling bifurcation and period tripling bifurcation. The computer-assisted proof uses rigorous ODE solvers and algorithms for computation of Poincare maps and their derivatives from the CAPD library.

Joint work with Irmina Walawska.