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Rapid and Accurate Computation of Invariant Tori and Manifolds Near Mean Motion Resonances in Periodically Perturbed PCRTBP Models.

When the planar circular restricted 3-body problem (RTBP) is periodically perturbed, most unstable resonant periodic orbits become invariant tori. In this study, we 1) develop a quasi-Newton method which simultaneously solves for the tori and their center, stable, and unstable bundles; 2) implement continuation by both perturbation as well as rotation numbers; 3) compute Fourier-Taylor parameterizations of the stable and unstable manifolds; 4) derive a Levi-Civita regularization of the equations of motion; and 5) globalize these manifolds, with a view to computing homoclinic and heteroclinic connections. Our methodology improves on efficiency and accuracy compared to prior studies, and applies to a variety of periodic perturbations. We demonstrate the tools on the planar elliptic RTBP. (Received January 18, 2021)