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*Using GPUs and the Parameterization Method for Rapid Search and Refinement of Connections between Tori in Periodically Perturbed Planar Circular Restricted 3-Body Problems.*

When the planar circular restricted 3-body problem is periodically perturbed, most unstable periodic orbits persist as invariant tori. However, 2D Poincaré sections no longer work to find their manifolds' intersections; new methods are needed to explore higher-dimensional objects and phase spaces. In this study, we first present a method of restricting the intersection search to only certain manifold subsets. We then represent the manifolds as discrete triangle meshes, and search for intersections between them, using methods inspired by computer graphics collision detection algorithms to make this computationally feasible. We implement this mesh search using Julia and OpenCL, gaining a 30x speedup in compute time by using GPUs. We finally show how to use manifold parameterizations to refine the approximate connections found in the mesh search. We demonstrate the tools on the planar elliptic RTBP. (Received January 18, 2021)