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Using BKK Theory in Restricted N-Body Problems

The purpose of this talk is to demonstrate the effectiveness of Bernstein–Khovanskii–Kushnirenko (BKK) theory for solving important finiteness problems in celestial mechanics. In particular, we show that it is not possible for a solution of the planar, circular, restricted three-body problem (PCR3BP) to travel along a level curve of the amended potential without being fixed at one of the five libration points (Saari’s conjecture for the PCR3BP). Equivalently, the only orbits traveling with constant speed are equilibria. We also use BKK theory to show that, for any choice of masses, the number of equilibria in the PCR4BP is finite and bounded above by 196.