

3-Body Problem: Key Partial Solutions with Years

Jacobi Integral (1836)

Solves: one conserved value in restricted rotating frame

Limits: needs a massless third body; chaos persists inside region

Lagrange / Euler Equilibria (1767–1772)

Solves: exact triangle or line balance points

Limits: stability fragile; moves break with small perturbations

KAM Theorem Islands (1954–1963)

Solves: most tori survive tiny perturbations (quasi-periodic)

Limits: only for small changes; real systems drift chaotic

Hill Stability (1878)

Solves: analytic bound forbids close approaches

Limits: gives no shape of the surviving orbit

Sundman Series (1912)

Solves: infinite series converges for all time

Limits: converges too slowly to simulate

Figure-Eight Choreography (1993 / 2000)

Solves: exact periodic orbit for equal masses

Limits: measure-zero case; vanishes when perturbed

Symplectic Integrator Bounds (1983)

Solves: numeric schemes keep energy error bounded

Limits: numerical only; no closed-form insight

Badger's Spiral Phase-Tension (this work) (2025)

Solves: analytic ceiling V_{\max} holds for any body count in spiral coords

Limits: needs spiral frame; still a conjecture, not yet a 'law'