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The Maslov index and Stability of Periodic Solutions

We employ techniques from symplectic geometry and specifically a variant of the Maslov index for curves of Lagrange planes along action-minimizing solutions to develop conditions which preclude eigenvalues of the monodromy matrix on the unit circle. This analytical method of proving stability is demonstrated in the context of selected special cases of the n -body problem, namely rhombus and parallelogram solutions of the four-body problem and hip-hop solutions of the $2n$ -body problem.