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*Index theory, Maslov index, Spectral flow, Colliding trajectories, Parabolic motions, Homothetic orbits*

We develop an index theory for parabolic and collision solutions to the classical n-body problem and we prove sufficient conditions for the finiteness of the spectral index valid in a large class of trajectories ending with a total collapse or expanding with vanishing limiting velocities. Both problems suffer from a lack of compactness and can be brought in a similar form of a Lagrangian System on the half time line by a regularising change of coordinates which preserve the Lagrangian structure. We then introduce a Maslov-type index which is suitable to capture the asymptotic nature of these trajectories as half-clinic orbits: by taking into account the underlying Hamiltonian structure we define the appropriate notion of geometric index for this class of solutions and we develop the relative index theory. We finally compute the Morse index for a class of collision and parabolic motions in Celestial Mechanics.