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Recent Developments in Classical Mechanics [Abstract Only]

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Recent developments in classical mechanics

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Hamiltonian systems with a finite number of degrees of freedom have traditionally been divided into two types: those with few degrees of freedom, which were supposed to exhibit some kind of regular ordered motion, approximately soluble by hamiltonian perturbation theory, and those with large numbers of degrees of freedom for which the methods of statistical mechanics should be used.

The past few decades have seen a complete change of view, affecting almost all practical applications of classical mechanics. The motion of a hamiltonian system is usually neither completely regular nor properly described by statistical mechanics. It exhibits both regular and chaotic motion for different initial conditions, and the transition between the two types of motion as the initial conditions are varied is subtle and complicated.

Variational principles, cantori, and their role in determining the transport properties of chaotic motion in hamiltonian systems and modular smoothing, a method for the rapid calculation of critical functions, which form the fractal boundary between regular and chaotic motion, have appeared in Percival (1987, 1990).

References

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