

Unified Symmetry and Conserved Quantities of Mechanical System in Phase Space

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Abstract: In this paper, a new symmetry and its conserved quantities of a mechanical system in phase space are studied. The definition of this new symmetry, i.e., a unified one is presented, and the criterion of this symmetry is also given. The Noether, the generalized Hojman and the Mei conserved quantities of the unified symmetry of the system are obtained. The unified symmetry contains the Noether, the Lie and the Mei symmetries, and has more generalized significance.

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Key words: unified symmetry, mechanical system, conserved quantity, phase space

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