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Time-scale version of generalized Birkhoffian mechanics and its symmetries and conserved quantities of Noether type. (English) Zbl 07428611


Summary: The time-scale version of Noether symmetry and conservation laws for three Birkhoffian mechanics, namely, nonshifted Birkhoffian systems, nonshifted generalized Birkhoffian systems, and nonshifted constrained Birkhoffian systems, are studied. Firstly, on the basis of the nonshifted Pfaff-Birkhoff principle on time scales, Birkhoff’s equations for nonshifted variables are deduced; then, Noether’s quasi-symmetry for the nonshifted Birkhoffian system is proved and time-scale conserved quantity is presented. Secondly, the nonshifted generalized Pfaff-Birkhoff principle on time scales is proposed, the generalized Birkhoff’s equations for nonshifted variables are derived, and Noether’s symmetry for the nonshifted generalized Birkhoffian system is established. Finally, for the nonshifted constrained Birkhoffian system, Noether’s symmetry and time-scale conserved quantity are proposed and proved. The validity of the result is proved by examples.

MSC:
70-XX Mechanics of particles and systems
35-XX Partial differential equations

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References:
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