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Presymplectic Lagrangian systems. II. The second-order equation problem.

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According to H. P. Künzle [same journal Sect. A (N.S.) **11** (1969), 393–414; [MR0278586 \(43 #4316\)](#)] and the authors, the “second-order equation problem” for degenerate Lagrangian systems on tangent bundles consists in finding conditions under which the coupled first-order Lagrange equations that follow from the constraint algorithm [the authors, *ibid.* Sect. A (N.S.) **30** (1979), no. 2, 129–142; [MR0535369 \(80j:58035\)](#)] are equivalent to a set of second-order differential equations. Typically, solutions of “consistent” Lagrange equations of motion are not globally second-order equations. The authors show that under an assumption of “admissibility” of the Lagrangian there exist certain submanifolds of the tangent bundle along which the Lagrange equations are second order. The proof contains an explicit construction of these submanifolds and their associated second-order solutions.

Reviewed by *Demeter Krupka*

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