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On the validity of Dirac's conjecture regarding first-class secondary constraints.

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Consider a degenerate Lagrangian system. Dirac's conjecture says that all first-class secondary constraints generate gauge transformations (motions which leave the physical state invariant). Dirac's test is whether all first-class constraints generate gauge transformations. The author (using only the standard canonical analysis of Dirac) presents two examples which cast doubt on Cawley's claim [see R. Cawley, *Phys. Rev. Lett.* 42 (1979), no. 7, 413–416] to have found systems for which the conjecture fails. The author claims that the significance of the failure of Dirac's test has not been made clear in the general case, and argues that in particular failure of the test need not imply failure of the conjecture. He argues further that the correctness of Dirac's conjecture depends in an essential way on the physical interpretation of the given Lagrangian; that for consistency the choice of physical interpretation should be part of the formal canonical analysis itself rather than having to be made on a case-by-case basis; and that if one chooses the "standard" interpretation, then Dirac's conjecture is true. Finally he points out that, when comparing the Lagrangian and Hamiltonian dynamics of a system, it is important, in order to avoid spurious conclusions, to take the same interpretation in both formalisms. *L. S. Wollenberg* (Oxford)