

Problem 1. Goldstein 1.10

Let q_1, \dots, q_n , be a set of independent generalized coordinates for a system of n degrees of freedom, with a Lagrangian $L(q, \dot{q}, t)$. Suppose we transform to another set of independent coordinates s_1, \dots, s_n by means of transformation equations

(Such a transformation is called a *point transformation*.) Show that if the Lagrangian function is expressed as a function of s_k , \dot{s}_j , and t through the equations of transformation, then L satisfies Lagrange's equations with respect to the s coordinates:

In other words, the form of Lagrange's equations is invariant under a point transformation.

Part (a)

Problem part description.

Solution

Solution

Part (b)

Another part

Solution

Problem 2. The Second Problem