

On variational formulations for functional differential equations

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Abstract. Necessary and sufficient conditions for the existence of integral variational principles for boundary value problems for given ordinary and partial functional differential equations are obtained. Examples are given illustrating the results.

1. Introduction

By the problem of construction of integral variational principles for a system of equations of some given model we mean the construction of functionals for which the set of critical (extremal or stationary) points coincides with the set of the solutions of the given system.

The search of a functional F , that admits the given equations as its Euler-Lagrange equations is known as the classical inverse problem of the calculus of variations. Since the end of the XIXth century there has been a