

1.1: Introduction

This chapter briefly reviews the historical evolution of classical mechanics since considerable insight can be gained from study of the history of science. There are two dramatically different approaches used in classical mechanics. The first is the vectorial approach of Newton which is based on vector quantities like momentum, force, and acceleration. The second is the analytical approach of Lagrange, Euler, Hamilton, and Jacobi, that is based on the concept of least action and variational calculus. The more intuitive Newtonian picture reigned supreme in classical mechanics until the start of the twentieth century. Variational principles, which were developed during the nineteenth century, never aroused much enthusiasm in scientific circles due to philosophical objections to the underlying concepts; this approach was merely tolerated as an efficient tool for exploiting classical mechanics. A dramatic advance in the philosophy of scientific thinking occurred at the start of the 20th century leading to widespread acceptance of the superiority of variational principles.

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