

Chapter 1

Introduction

Abstract Introduction of Part I which is devoted to the derivation of the principle of virtual work. The derivation is based on observation and simple experiments. The principle is extended by induction.

The derivation of the equations of motion of a system is sometimes straightforward and simple. But enhanced description of motion may intricate their derivation.

A useful tool to overcome such difficulties may be to derive the equations of motion with the principle of virtual work.

We give the basic ideas while describing the motion on a plane of a system made of two disks. We show that the velocities and the velocities of deformation of the systems are quantities which are seen, experimented and measured: thus we choose them as the basic elements of a mechanical predictive theory. The internal forces are by-products which are abstract quantities which may be experimented only through motion.

The theory based on the two disk system motion is given in Chaps. 2–10. At each step, the theoretical aspects are supported by observation. As any principle, the principle of virtual work, is based on some experiments and extended by induction. Its ability to predict the motion of a system, is justified by the quality of the results when applied.