The Principle of Independence.

1. Illustrations.

If two physicists perform the same experiment in different places or at different times to obtain different results, then they assume that the difference in the results is due, not to the difference of place but to a difference of something in the place, and not to the difference of time but to a difference of something at the time.

This assumption illustrates the principle of independence in its simplest form. There are not different laws of physics for each place and for each time. One set of laws suffices for all places and all times. Hence, the laws of physics, and similarly the laws of any science, are independent of particular places and of particular times.

A first generalization of the principle of independence is illustrated by Newton's first law of motion. It states that a body continues in its state of rest or of uniform motion as long as no external force intervenes.

The elementary principle prescribed that nothing was explained merely by place or merely by time. The first generalization prescribes that nothing is explained by mere change of place or mere change of time. When a body changes from rest to motion, an explanation is needed. When the momentum of a moving body changes, an explanation is needed. But when momentum is constant, there is mere change of place and time

Hence, when a body changes from rest to motion, or when the momentum of a moving body changes, an explanation is to be sought. But when momentum is constant, the only change is in place and time

It follows that, when the first law of motion is taken in its context, it is an instance of the principle of independence. For the context implies that there are laws of motion, that is, correlations between dependently varying terms. Then the first law is to the effect that among the dependently varying terms there is no term that corresponds to mere change of place