

Leibniz:

Space (time): Space (time) is not a substance; substances are true individuals, intrinsically distinguishable from one another, unlike the parts of space (moments of time).

Space (time) is therefore something ideal, an “order of situation” (succession) abstracted from the spatial (temporal) relations of bodies; these relations themselves are abstracted from correspondences among the points of view of individual substances.

Inertia: a property of bodies to remain at rest until acted upon by some force.

Inertia therefore corresponds to inactivity (therefore differs from the tendency to continue in motion, which is the result of an active force).

Types of force:

i) *Primitive Active Force*: the striving of the substance toward its states (its apperceptions), resulting from the substance's appetition.

ii) *Primitive Passive Force*: impenetrability combined with “repugnance to motion”

iii) *Derivative Active Force*: phenomenal analogue to primitive active force

iv) *Derivative Passive Force*: phenomenal analogue to inertia and antitypy

Living Force (vis viva): mv^2 , the “metaphysical basis” of physical activity; *Dead Force*: instantaneous living force.

Relativity: All rectilinear motions are equivalent; therefore all motions are equivalent, since all are composed of rectilinear motions. Yet every body has a certain degree of motion or living force.

Planetary system: All hypotheses are equivalent. But the Keplerian not only is simpler astronomically, but accords better with the requirements of physical-causal explanation.

Gravity: All physical interaction is by immediate contact (to deviate from rectilinear motion without immediate contact with another body is a miracle), so gravity must be the effect of fluid pressure.

Newton:

Space (time) is not a substance, but a framework that alone makes the existence of substances intelligible. Parts are indistinguishable except by relative position.

Space (time) is therefore something real, an affection of every real thing, an “order of situation” (succession) with respect to which bodies can be said to have physical relations and properties, including states of motion.

Inertia is a property of bodies to persist in their state of uniform motion or rest; and to resist as much as they are resisted (in other words inertia is defined by *all three* of Newton's laws)

Inertia can be viewed equivalently as activity or inactivity, as the body in question is regarded as in uniform motion or at rest. (Cf. Definition III)

Only one type of force: power to change the velocity of a body, therefore defined and measured by the changes produced

[No analogue to primitive forces in Newton's view; force *always* refers to something “phenomenal”]

Inertia of a body regarded as moving (“impulse” or power to overcome the inertia of another)

Inertia of a body regarded as resting (“resistance”)

These quantities depend on momentum (mv), therefore are frame-dependent, not invariant.

All *uniform* rectilinear motions are equivalent. Yet every body must have a velocity in absolute space. But forces cannot distinguish motion from rest, or even uniform motion from uniform acceleration. (Cor. V, VI)

If the planetary system is assumed to be governed by the laws of motion, the Keplerian phenomena *strictly require* that the sun is approximately in the center of gravity.

Physical interaction is restricted only by the laws of motion. Apart from these laws, action by contact and action at a distance are equally unintelligible. Understanding of gravity is therefore not restricted by need for mechanical explanation.