

On the Classical Mechanics of Particles II

Annex I

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Reformulation of the New Dynamics

First definition: The force \mathbf{F} acting on a particle is a vector quantity representing the interaction between particles.

The transformation of forces from one reference frame to another is given by

$$\mathbf{F}' = \mathbf{F}$$

Second definition: The inertial mass m of a particle is a scalar quantity representing a constant characteristic of the particle.

The transformation of inertial masses from one reference frame to another is given by

$$m' = m$$

Third definition: The inertial acceleration \mathbf{a}° of a particle is equal to the sum of the forces $\sum \mathbf{F}$ acting on the particle divided by the inertial mass m of the particle.

$$\mathbf{a}^\circ = \frac{\sum \mathbf{F}}{m}$$

First principle: The real acceleration \mathbf{a}_a of a particle A relative to a reference frame S fixed to a particle S is equal to the difference between the inertial acceleration \mathbf{a}_a° of particle A and the inertial acceleration \mathbf{a}_s° of particle S.

$$\mathbf{a}_a = \mathbf{a}_a^\circ - \mathbf{a}_s^\circ$$