New Concept of Conservation Laws

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Abstract

In contemporary physics a conservation law states that the total sum of particular measurable properties of an isolated physical system remains constant over time. This statement is incomplete. This article formulates a complete set of conservation laws.

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Introduction

The statement of conservation laws over the 20th century has not changed. Conservation law, also called Law of conservation in physics represents several principles that state that certain physical properties (i.e., measurable quantities) do not change in the course of time within an isolated physical system. … In an isolated system the sum of all forms of energy therefore remains constant. [1, 2, 3].

The definitions are inconsistent because a physical system is isolated if it is in equilibrium. In the equilibrium, the sum of all active components is zero. If the sum is constant, there are some interactions with outside quantities. Therefore the system is not isolated.

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The rubber balloon with gas is a model of an isolated system. The pressure inside the balloon remains constant over time if there is no interaction with outside space. This is consistent with the definition of Conservation law. It is not taken into account that the pressure of gas inside the balloon is in equilibrium with the pressure of the rubber membrane. The sum of all pressures is zero. It is a complete statement.

Complete Conservation law

The completeness principle of a physical theory, a law or a logical conclusion states that all individual components must be in equilibrium [4, 5]. Mathematically it can be expressed as the case where the sum of systems constituents is equal to zero.
In accordance with the rules of the completeness principle, conservation laws should be written as follows:

$$\sum_{j=1}^{n} W_j = 0 \qquad (1)$$

Where: W_j – value of quantity number j

n – total number of quantities W in the system.

The quantity W can be energy, mass, linear or angular momentum, electric charge, parity, lepton number, baryon number, strangeness, hyper-charge, etc. According to the equation (1) one gets a complete conservation law of quantity W.

Conclusions

Consequences of the equation (1) are:

1. Conservation laws are symmetric. It complements Noether theorem that states: “every differentiable symmetry of the action of a physical system has a corresponding conservation law” [6].

2. Every physical quantity, which can be conserved over time, has an opposite one.

3. Antiparticles have negative mass and as an aftereffect - antigravitation. The antigravitation repels ordinary matter and attracts antimatter. Finally the antimatter is concentrated in Anti-universe and cannot be found in our Universe. It solves the puzzle of baryon asymmetry in our Universe.

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