About proofs in physics and mathematics

1. Mathematics is the natural language of physics. However, the key concept of proof for mathematics within the framework of physics must be substantially transformed. Namely, a purely mathematical (formal) proof carried out within the framework of a mathematized physical theory cannot be accepted if it contradicts established physical concepts or experimental results. This is explained by the fact that every mathematized field of physics is a model of physical reality, and no model that is identical to the original.

2. The notion of mathematical proof as an "absolute truth" that existed in the past centuries has been shaken in recent decades. Even in classical areas of mathematics built on an axiomatic basis, such as Hilbert elementary geometry, missing logical constructions have been found.

3. In applied fields, a computational experiment performed with the help of computers is accepted as a mathematical proof. Computers are also used to carry out proofs in some sections of pure mathematics (for example, the proof of the four colors hypothesis in graph theory). This circumstance reduces the status of the absolute truth of mathematical proof and puts mathematics in one row with some sections of natural science.