"Philosophy of science without history of science is empty; history of science without philosophy of science is blind." [1] E. Wigner1995 said, "The first point is that the enormous usefulness of mathematics in the natural sciences is something bordering on the mysterious and that there is no rational explanation for it."[2] This quotation from the pioneer of quantum physics shows that elucidating the essential nature of mathematics is important for the natural science.

Dedekind[3]

Cantor1[4]

Poincar1[5]

$$\frac{\partial h_z}{\partial y} - \frac{\partial h_y}{\partial z} = \frac{1}{c}\frac{\partial e_x}{\partial t} + \frac{1}{c} i_x \,, \quad \frac{\partial h_x}{\partial z} - \frac{\partial h_z}{\partial x} = \frac{1}{c}\frac{\partial e_y}{\partial t} + \frac{1}{c} i_y \,, \quad \frac{\partial h_y}{\partial x} - \frac{\partial h_x}{\partial y} = \frac{1}{c}\frac{\partial e_z}{\partial t} + \frac{1}{c} i_z \,. \text{ [6]}$$

References

[1] Lakatos, I.: *History of science and its rational reconstructions* **1970**, 91–136 (1970)

[2] Wigner, E.P.: *The unreasonable effectiveness of mathematics in the natural sciences* (1967)

[3] Dedekind, J.W.R.: *Stetigkeit und Irrationale Zahlen* (1872)

[4] Cantor, G.: *über die unendliche lineare punktmannigfalltigkeiten. nr. 5. grundlagen einer allgemeinen mannigfalltigkeitslehre.* Mathematischen Annalen **21**, 183–190 (1883). Reprinted by Georg Olms, Hildesheim, 1966

[5] Poincaré, H.: *La science et l'hypothèse* (1902). English translation by W. J. G. Science and Hypothesis, W. Scott, London, 1905,

[6] Einstein, A.: *Albert Einstein's title* (9876)