Equivalent Fundamental Physical Quantities and dimensions in special relativity

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ABSTRACT

If we want to get the Derived quantities Lorentz transformation we must be finds the Lorentz transformations for Fundamental Physical Quantities

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Keywords

Derived quantities, Lorentz transformation, Fundamental Physical Quantities,

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Introduction

Shortages in the theory of special relativity:

The theory of special relativity requires that the laws of the universe be the same for the objects that move with uniform velocity to each other. The law that changes from one frame to another is wrong. Lorentz transformations do not guarantee only three transformations. These three quantities are length, time and mass, which basic are physical quantities. Derived quantities can be derived from it covering the laws of mechanics only. In addition, the Lorentz transformation of the mass was found using the principle of corresponding and not directly if we want to get the Derived quantities Lorentz transformation we must be finds the Lorentz transformations for Fundamental Physical Quantities.

SI base quantities, symbol and units

Fundamental Physical Quantities are length $\boldsymbol{x}$ *(metre)*; time $\boldsymbol{t}$ (second), mass $\boldsymbol{m}$ (kilogram), electric current $\boldsymbol{I}$ (ampere), thermodynamic temperature $\boldsymbol{T}$ (kelvin), amount of substance $\boldsymbol{n}$ (mole), luminous intensity $\boldsymbol{I_v}$ (candela)

Contribution

Motivations

(1) Finding Lorentz transformations for *length* $\boldsymbol{x}$, time $\boldsymbol{t}$, mass $\boldsymbol{m}$, electric current $\boldsymbol{I}$, thermodynamic temperature $\boldsymbol{T}$, amount of substance $\boldsymbol{n}$, luminous intensity $\boldsymbol{I_v}$.

(2) Find the derived physical quantities.

(3) Answer the question why charge is Lorentz invariant but relativistic mass and a charge- current density is not?

(4) Finding changes of the constants such as constant of gravity.

(5) Answer the question do the Planck length, time and mass follow the Lorentz contraction?

Example

By using mass as the fifth dimension, you can find Lorentz transformation of mass.

$$\boldsymbol{X_1}^2 - \boldsymbol{C_1}^2\boldsymbol{T_1}^2 - \frac{\boldsymbol{G_1}^2}{\boldsymbol{C_{M1}}^4}\boldsymbol{M_1}^2 = \boldsymbol{X_2}^2 - \boldsymbol{C_2}^2\boldsymbol{T_2}^2 - \frac{\boldsymbol{G_2}^2}{\boldsymbol{C_{M2}}^4}\boldsymbol{M_2}^2$$

$$M_2 = \gamma M_1$$

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