Obzory matematiky, fyziky a informatiky 4/2008 (37)

Štýl **0MFI - Nadpis článku**

The Paradox of the Flying Rod

Štýl **0MFI - Abstract - anglický**

Štýl **0MFI – Meno autora**

Aba Teleki

**Abstract:** The aim of this article is to show a simple geometrical method applicable in solving some kind of two (and more) dimensional relativistic problems. The method is demonstrated on a well known paradox of flying rod.

**Key words:** theory of relativity, paradox, Lorentz transformation

Štýl **0MFI – Key words**

**Súhrn:** Cieľom práce bolo ukázať jednoduchú geometrickú metódu k riešeniu niektorých dvoj- a viacrozmerných úloh v špeciálnej teórii relativity. Metóda je demonštrovaná na dobre známom paradoxe letiacej tyče.

Štýl **0MFI – Kľúčové slová**

Štýl **0MFI - Abstrakt- slovenský**

**Kľúčové slová:** teória relativity, paradox, Lorentzova transformácia

Štýl **0MFI – MESC kódy**

**MESC:** M50

Introduction

Štýl **0MFI –** **Nadpis úrovne 1**

There is many interesting paradoxes in special theory of relativity and many methods how to solve them. The universal method is based on the Lorentz transformation (only the first paragraph in the section is without indent)

Equations place in the second column. The table has three columns (width: 1 cm, 11, cm, 1 cm). Creae the equations by using the Equation editor.

Štýl **0MFI – Základný text – 1. odstavec**

|  |  |  |
| --- | --- | --- |
| Štýl **0MFI –** **Základný text za vzorcom**  Štýl **0MFI - Vzorec** | , , , | (1a) (1b) (1c) (1d) |

where

|  |  |  |
| --- | --- | --- |
|  | and . | (2) |

…

One cannot use directly the very effective geometric method of Loedel’s diagrams presented in [1-6], for more dimensional problems. The using of Lorentz transforms (1) by combining boosts in two different directions may cause significant problems. The essence of the problem is hidden in the properties of parallelism in the special theory of relativity. (the second and other paragraphs in the section are with indent)

Štýl **0MFI –** **Základný text**

…

Observing from the frame of the wall

Look figure 2 describing the general situation from the point of view of the observer 1. Anything in this paragraph is described from the point of view of the observer 1, i.e. in the frame (use the Equation editor to create a mathematical symbol in the text )

Štýl **0MFI –** **Obrázok popis**

Štýl **0MFI –** **Obrázok na celú šísku**

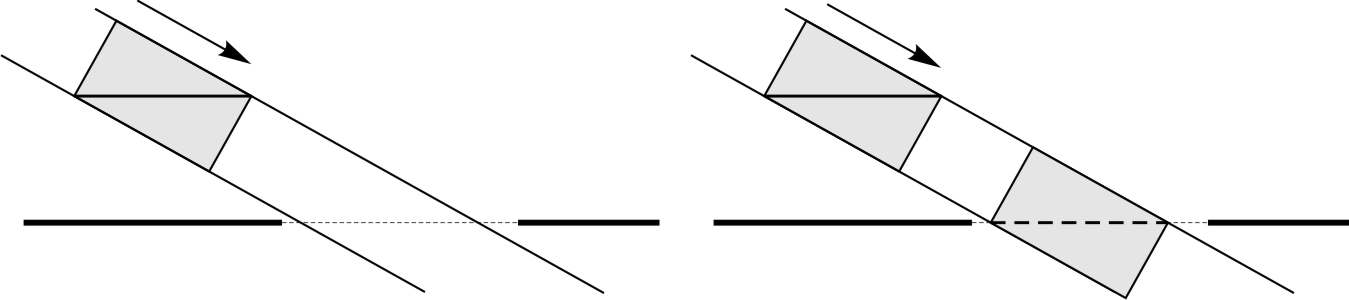


Fig. 2: a) The rod flying with velocity toward the wall encompassed by the R-box. In the frame the flying rod is paralell by the wall all the time. b) The H-box and R-box are identical in the frame . While the R-box is flying with the velocity in the frame , the H-box is in rest.

*R-box*

*H-box*

*R-box*

…

Conclusion

By using the linearity of the Lorentz transformations, and the relativistic length contraction formulae, one can solve two (or three) dimensional problems without any difficulties. It is not necessary to be familiar with the complicated algebra of the Lorentz group SO(3,1).

Acknowledgement

The article was supported by the Ministry of Education of the Slovak Republic under Grants no. KEGA 3/6472/08.

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