Eletromagnetismo

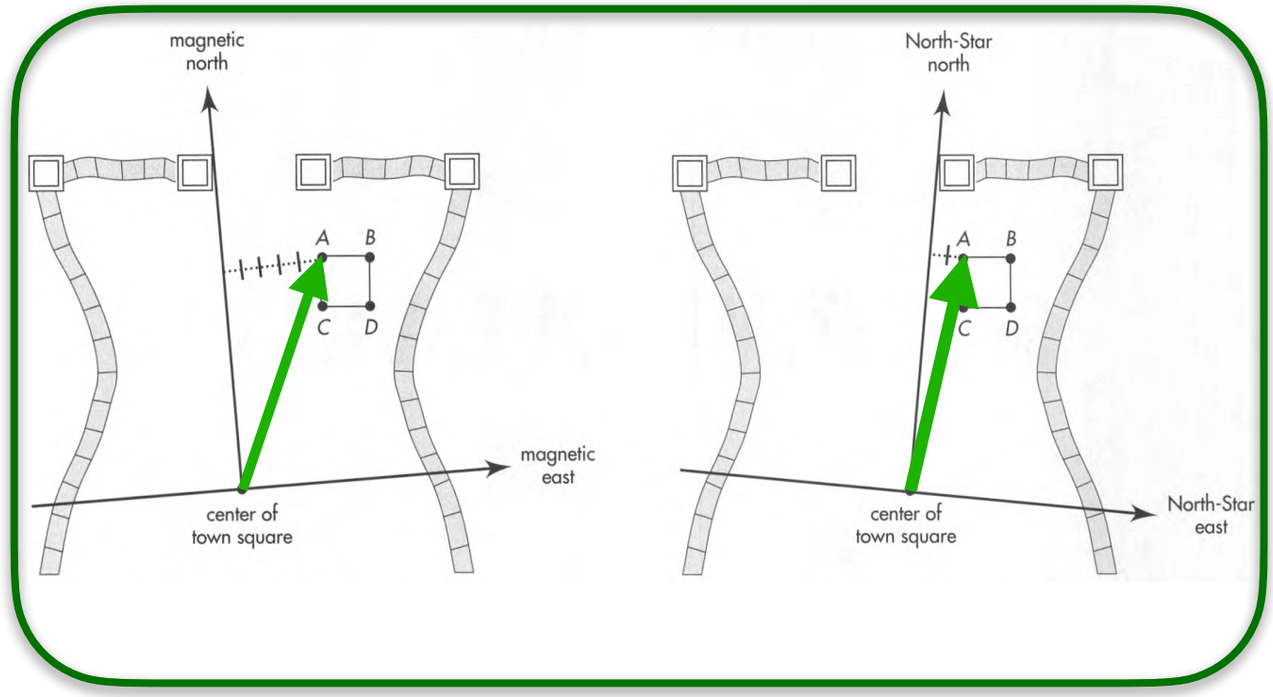
Avançado

4º ciclo
Aula de 3 de dezembro

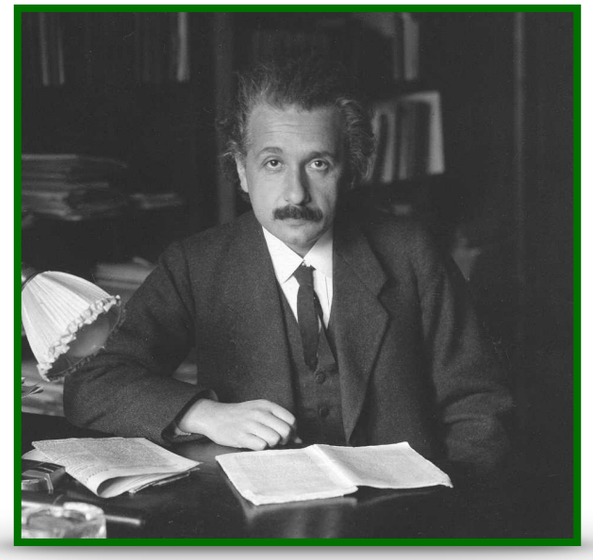
A parábola dos topo

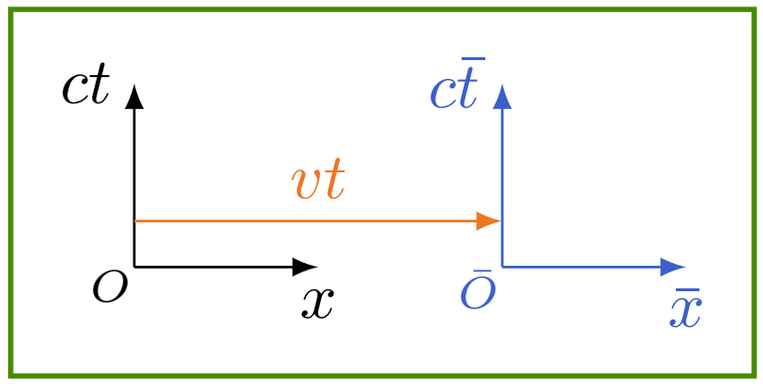
$$\begin{pmatrix} k\bar{y} \\ \bar{x} \end{pmatrix} = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix} \begin{pmatrix} ky \\ x \end{pmatrix}$$

$$\Rightarrow \quad (k\bar{y})^2 + \bar{x}^2 = (ky)^2 + x^2$$



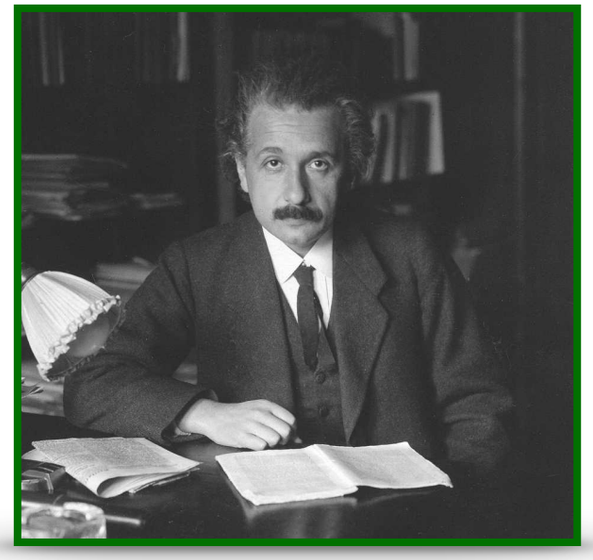
Os princípios da relatividade especial

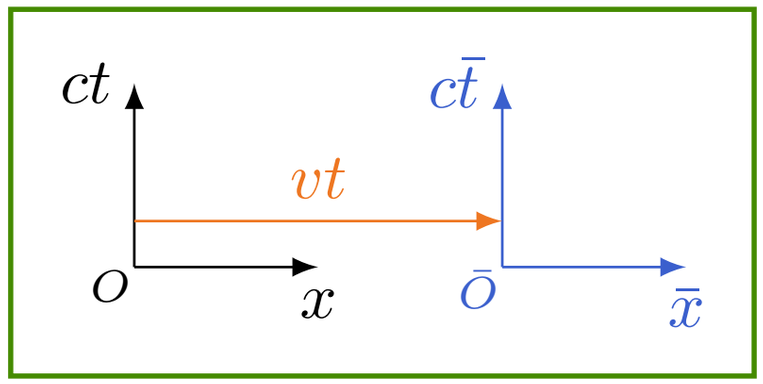




Os princípios da relatividade especial

Referenciais em movimento uniforme





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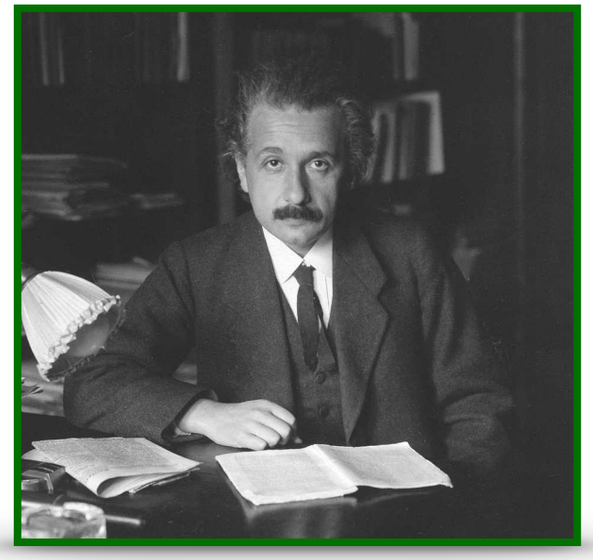
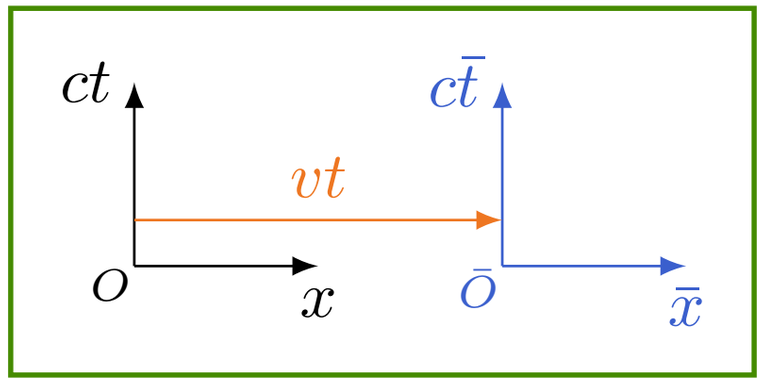


I. Leis independem do referencial



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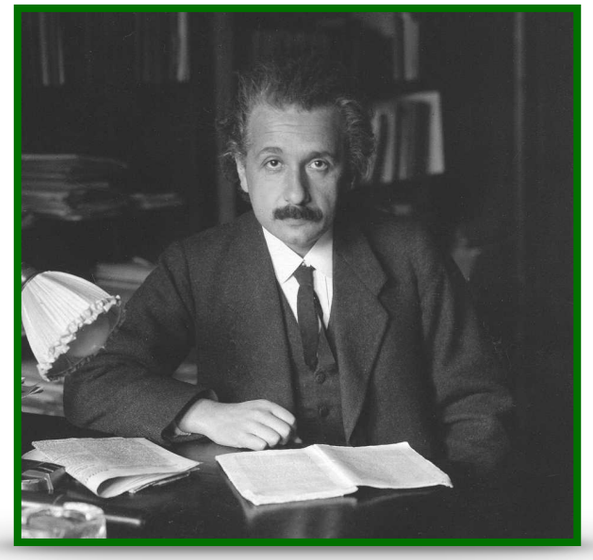
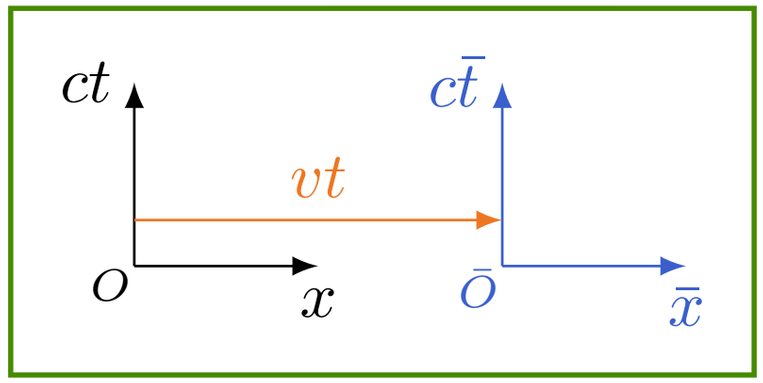


I. Leis independem do referencial

II. Velocidade luz independe do referencial



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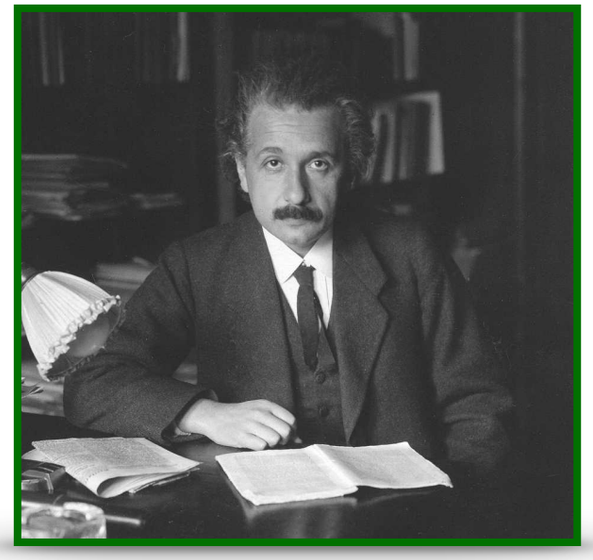

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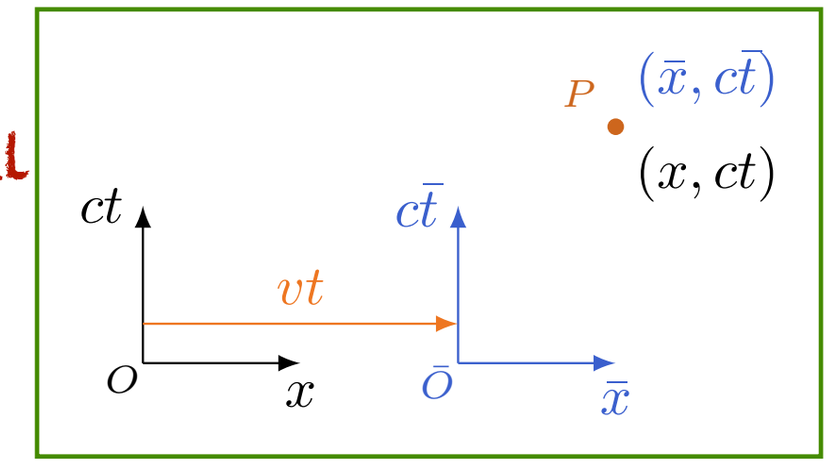

$$c^2\bar{t}^2 - \bar{x}^2 = c^2t^2 - x^2$$

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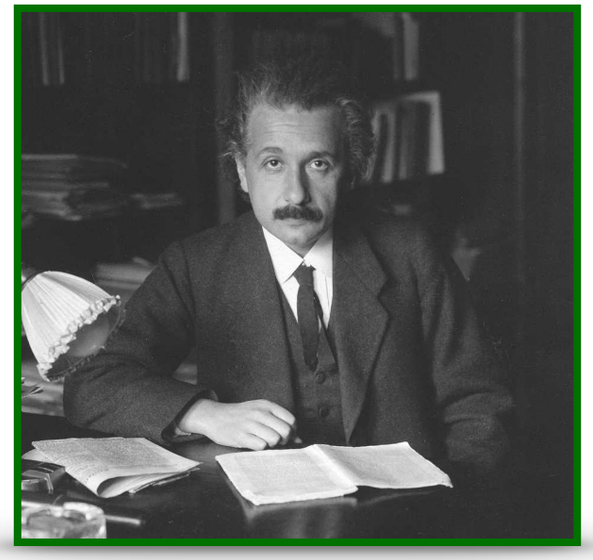

$$(\bar{y}^2 + \bar{x}^2) = (y^2 + x^2)$$

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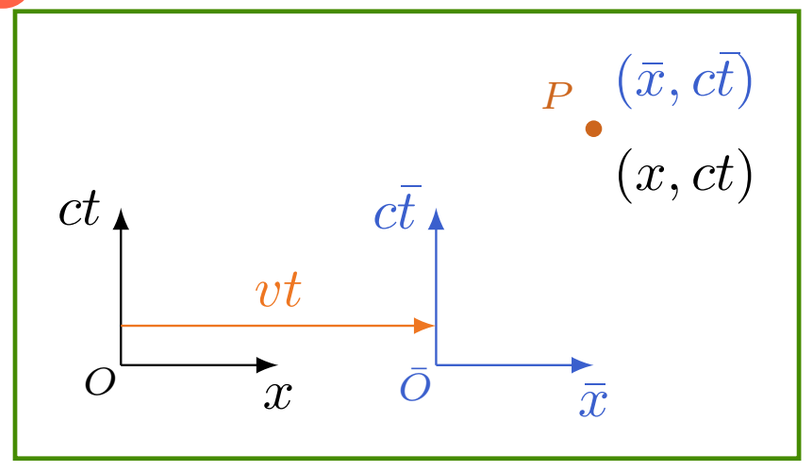

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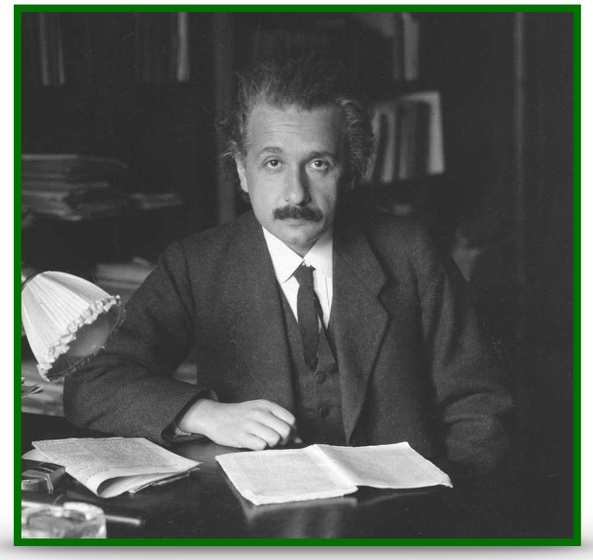

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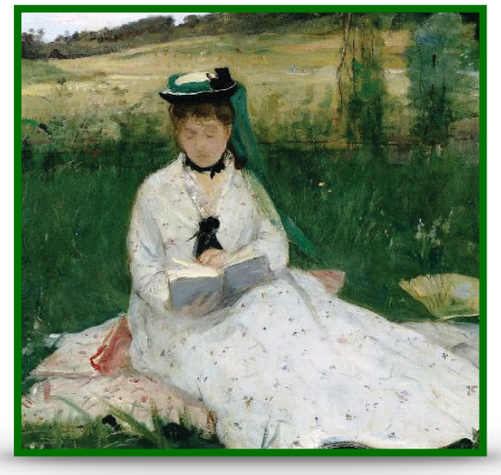

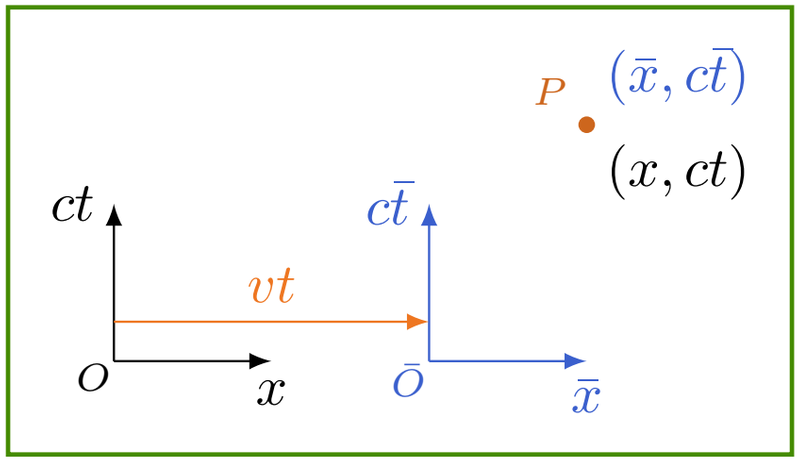

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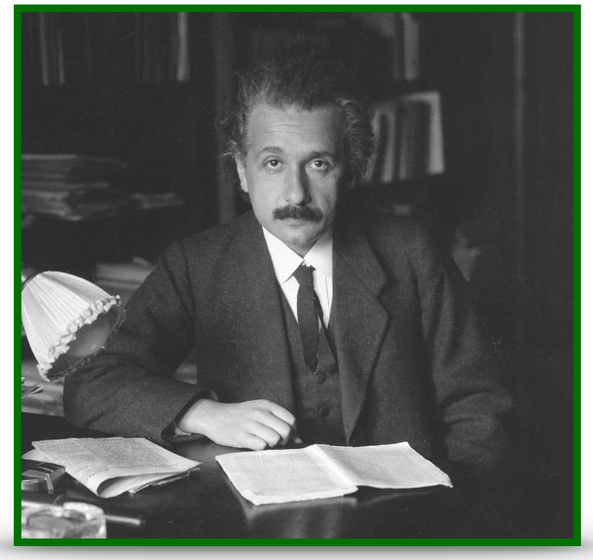

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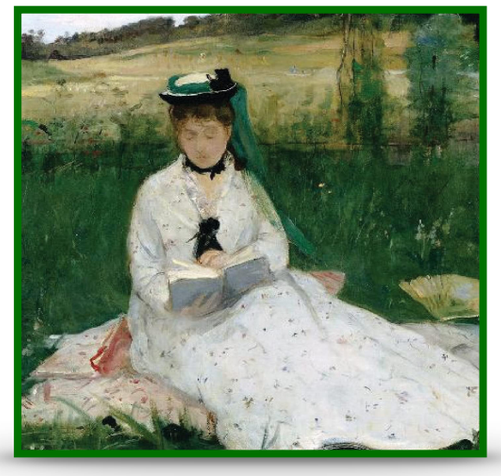

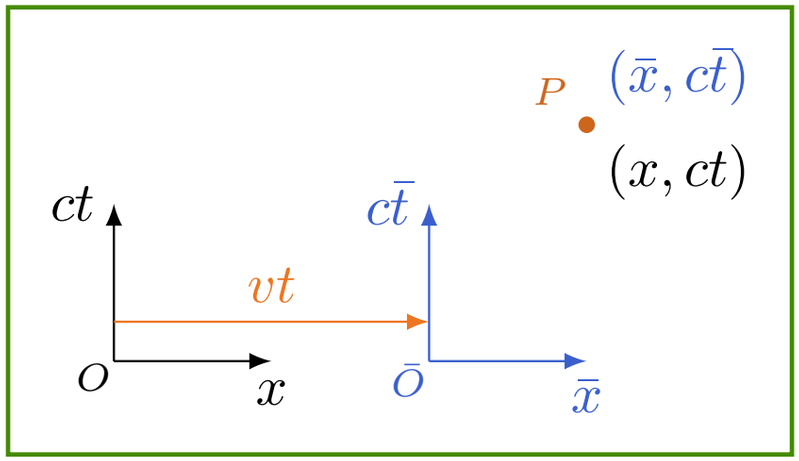

$$c^2\bar{t}^2 - \bar{x}^2 = c^2t^2 - x^2$$

$$\begin{pmatrix} c\bar{t} \\ i\bar{x} \end{pmatrix} = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix} \begin{pmatrix} ct \\ ix \end{pmatrix}$$

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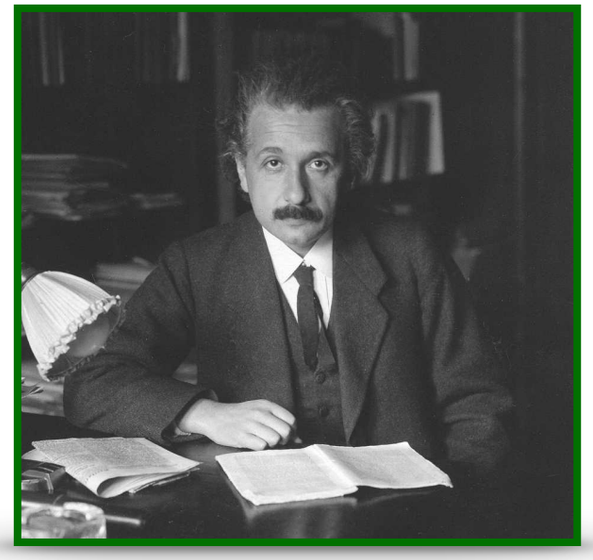

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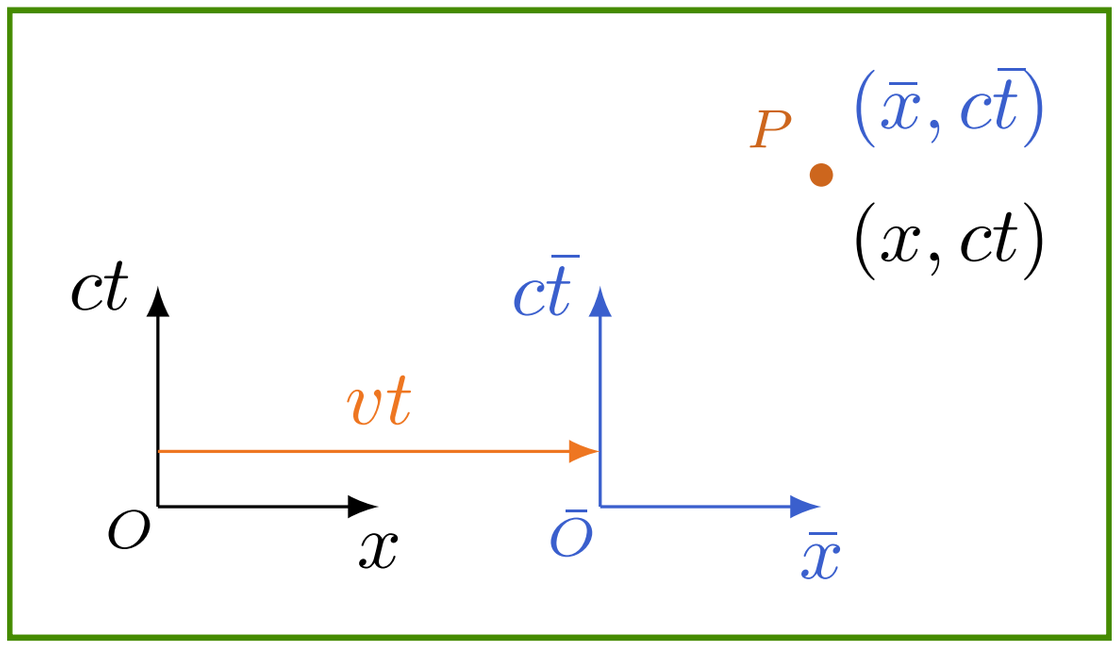
$$x = vt \quad \Rightarrow \quad \bar{x} = 0$$



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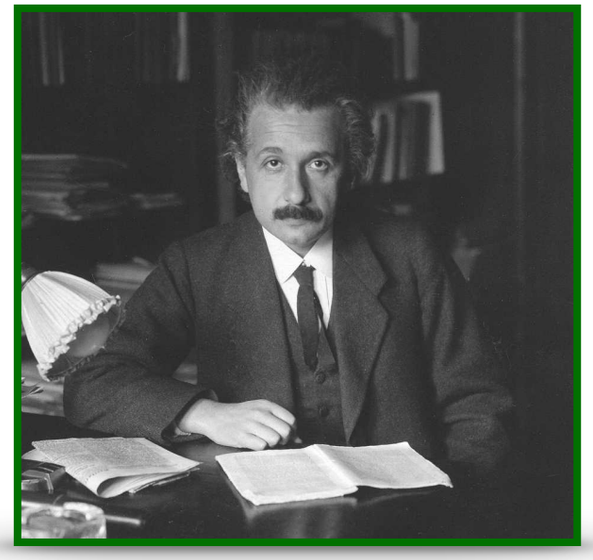

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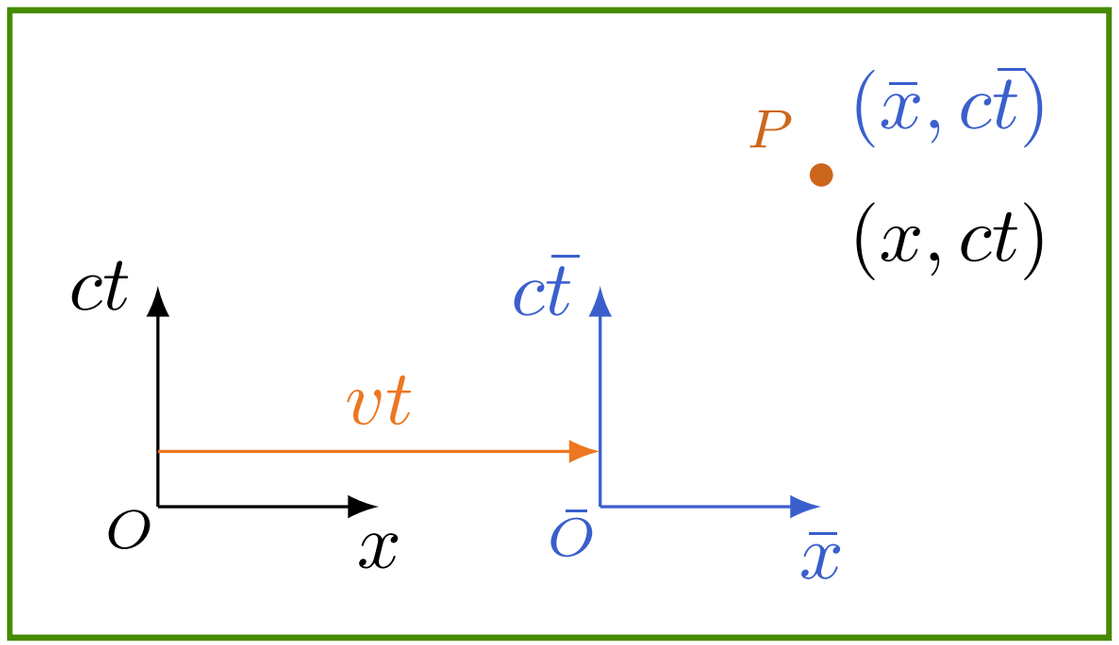
$$\tan\alpha = -i\frac{v}{c}$$

$$\cos\alpha = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$



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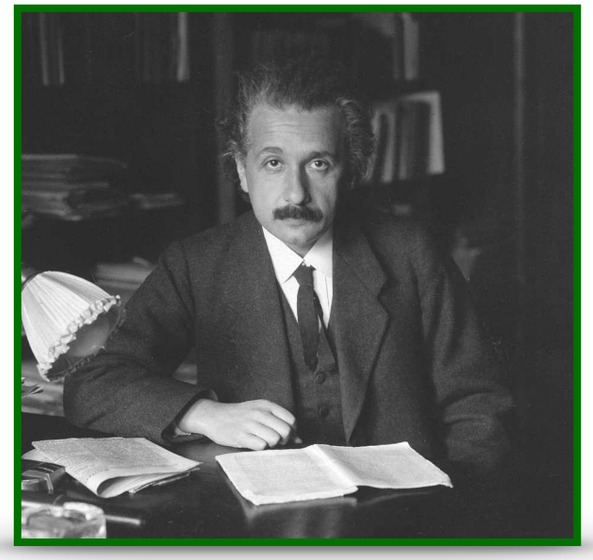

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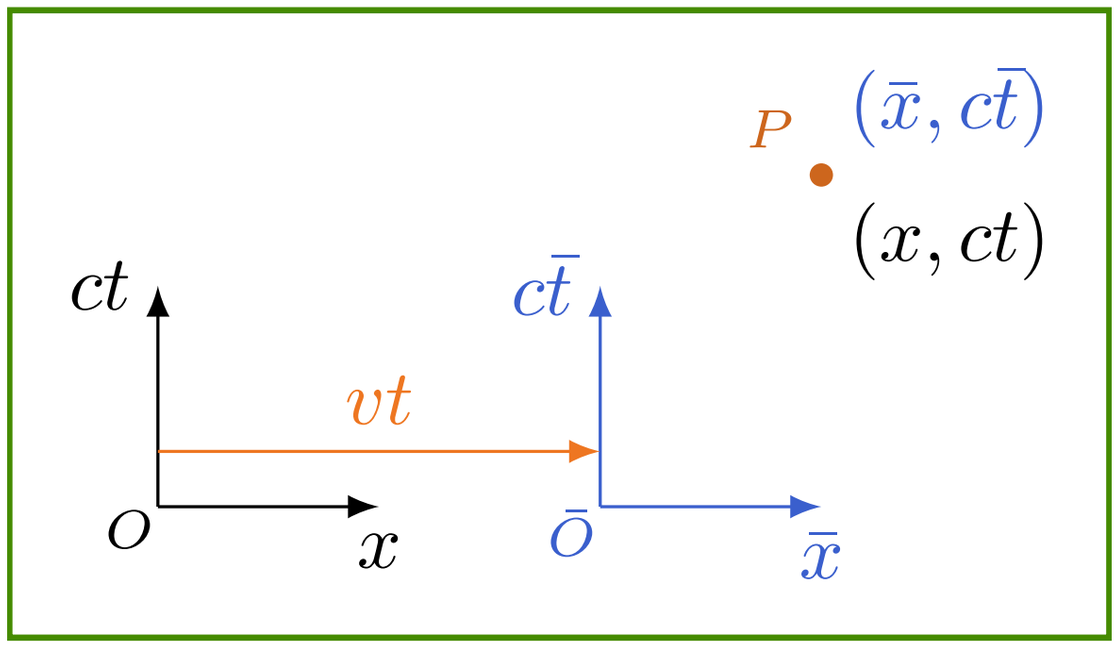
$$\cos\alpha = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \equiv \gamma$$

$$\sin\alpha = \frac{-i\frac{v}{c}}{\sqrt{1 - \frac{v^2}{c^2}}} \equiv -i\beta\gamma$$



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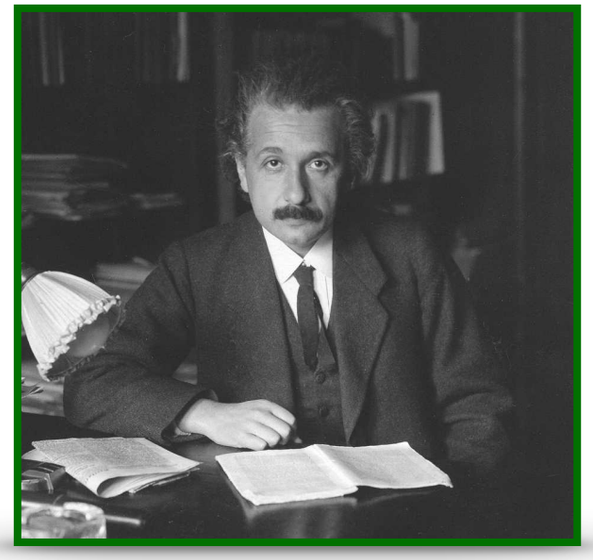

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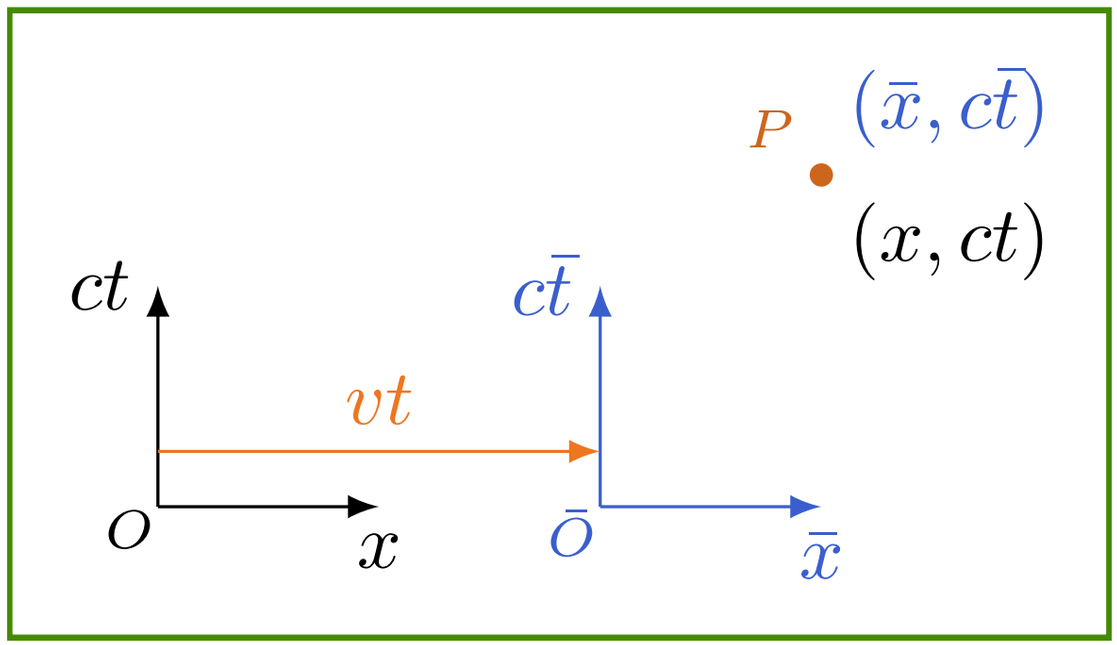
$$\begin{pmatrix} c\bar{t} \\ \bar{x} \end{pmatrix} = \begin{bmatrix} \gamma & -\beta\gamma \\ -\beta\gamma & \gamma \end{bmatrix} \begin{pmatrix} ct \\ x \end{pmatrix}$$

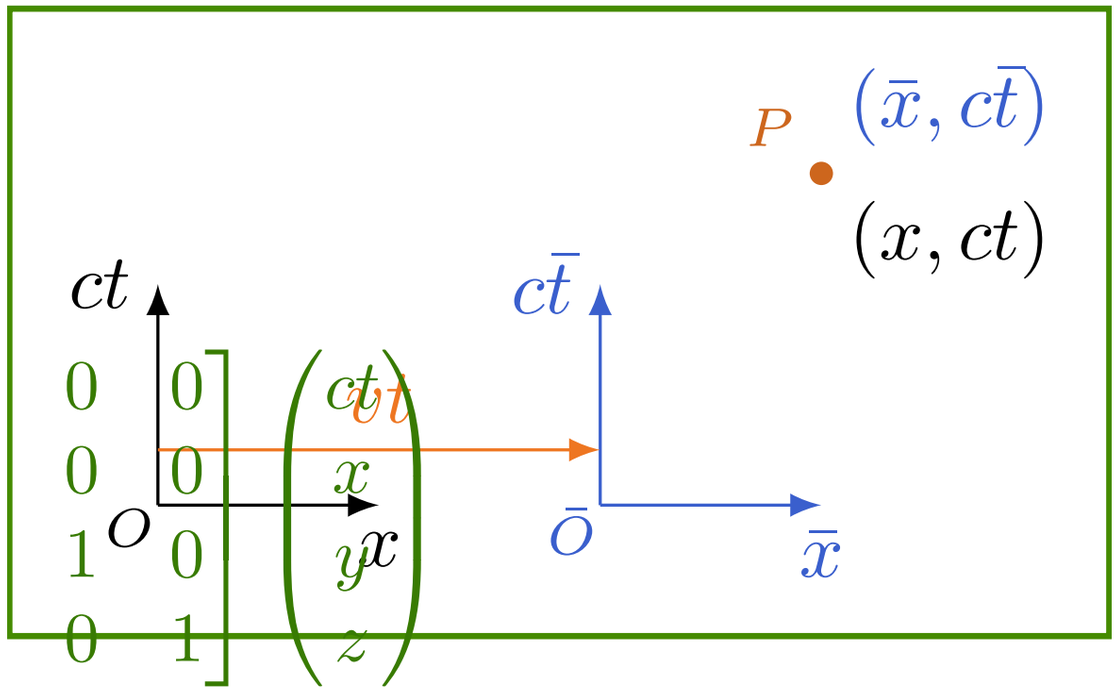


Transformação de Lorentz

$$c^2\bar{t}^2 - \bar{x}^2 = c^2t^2 - x^2$$

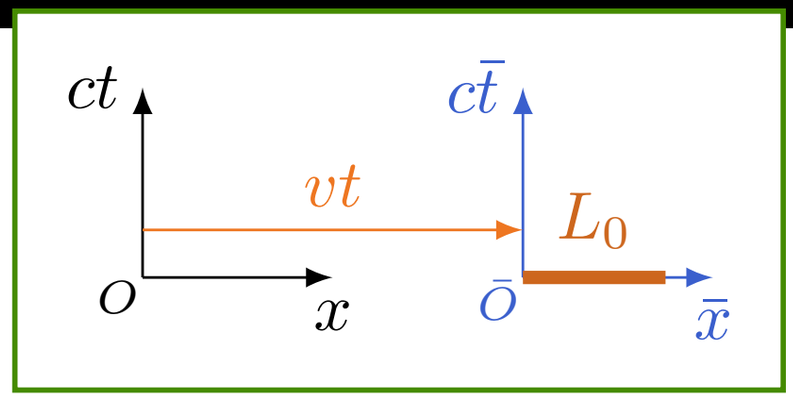
$$\begin{pmatrix} c\bar{t} \\ \bar{x} \end{pmatrix} = \begin{bmatrix} \gamma & -\beta\gamma \\ -\beta\gamma & \gamma \end{bmatrix} \begin{pmatrix} ct \\ x \end{pmatrix}$$

$$\begin{pmatrix} c\bar{t} \\ \bar{x} \\ \bar{y} \\ \bar{z} \end{pmatrix} = \begin{bmatrix} \gamma & -\beta\gamma & 0 & 0 \\ -\beta\gamma & \gamma & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{pmatrix} ct \\ x \\ y \\ z \end{pmatrix}$$



$$\begin{pmatrix} c\bar{t} \\ \bar{x} \\ \bar{y} \\ \bar{z} \end{pmatrix} = \begin{bmatrix} \gamma & -\beta\gamma & 0 & 0 \\ -\beta\gamma & \gamma & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{pmatrix} ct \\ x \\ y \\ z \end{pmatrix}$$

Pratique o que aprendeu



$$\begin{pmatrix} c\bar{t} \\ \bar{x} \\ \bar{y} \\ \bar{z} \end{pmatrix} = \begin{bmatrix} \gamma & -\beta\gamma & 0 & 0 \\ -\beta\gamma & \gamma & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{pmatrix} ct \\ x \\ y \\ z \end{pmatrix}$$

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