

20. Transformace rychlostí

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Vezmeme Lorentzovu transformaci a zdiferencujeme

$$\tilde{x} = \gamma(x - vt) \rightarrow d\tilde{x} = \gamma(dx - vdt)$$

$$\tilde{t} = \gamma\left(t - \frac{vx}{c^2}\right) \rightarrow d\tilde{t} = \gamma\left(dt - \frac{vdx}{c^2}\right)$$

$$\tilde{u} = \frac{d\tilde{x}}{d\tilde{t}} = \frac{\gamma(dx - vdt)}{\gamma\left(dt - \frac{vdx}{c^2}\right)} = \frac{dx - vdt}{dt - \frac{vdx}{c^2}} = \frac{\frac{dx}{dt} - v}{1 - \frac{v}{c^2} \frac{dx}{dt}} \quad \begin{array}{l} u = \frac{dx}{dt} \\ \downarrow \\ \frac{u - v}{1 - \frac{uv}{c^2}} \end{array}$$

$$\tilde{u} = \frac{u \pm v}{1 \pm \frac{uv}{c^2}} \quad \left| \begin{array}{l} \text{Pokud soustavy leží od sebe tak} \\ \tilde{u} = \frac{u + v}{1 + \frac{uv}{c^2}} \end{array} \right.$$