# Rindlerovy souřadnice

inerc. souř. $t, z$

nulové souř. $u, v$

$$u = t - z \qquad t = \frac{u+v}{2}$$
$$v = t + z \qquad z = \frac{v-u}{2}$$

nulové Rindlerovy souř. $U, V$

$$u = s_u \exp(-U) \qquad U = -\log|u| \qquad s_u = \operatorname{sign} u$$
$$v = s_v \exp(V) \qquad V = \log|v| \qquad s_v = \operatorname{sign} v$$

Rindlerovy souř. $\tau, b$

$$U = \tau - \ln b \qquad b > 0$$
$$V = \tau + \ln b \qquad \tau \in \mathbb{R}$$

$$t^2 - z^2 = uv = s_u s_v \exp(V-U) = s_u s_v b^2 = \overset{F,P}{\underset{L,R}{\pm}} b^2$$

R, L oblasti

$$t = \frac{v+u}{2} = \overset{R}{\underset{L}{\pm}} \frac{1}{2}(e^V - e^{-U}) = \pm b \operatorname{sh}\tau \qquad \operatorname{th}\tau = \frac{t}{z}$$
$$z = \frac{v-u}{2} = \pm \frac{1}{2}(e^V + e^{-U}) = \pm b \operatorname{ch}\tau \qquad b^2 = z^2 - t^2$$

F, P oblasti

$$t = \frac{v+u}{2} = \overset{F}{\underset{P}{\pm}} (e^V + e^{-U}) = \pm b \operatorname{ch}\tau \qquad \operatorname{th}\tau = \frac{z}{t}$$
$$z = \frac{v-u}{2} = \pm (e^V - e^{-U}) = \pm b \operatorname{sh}\tau \qquad b^2 = t^2 - z^2$$

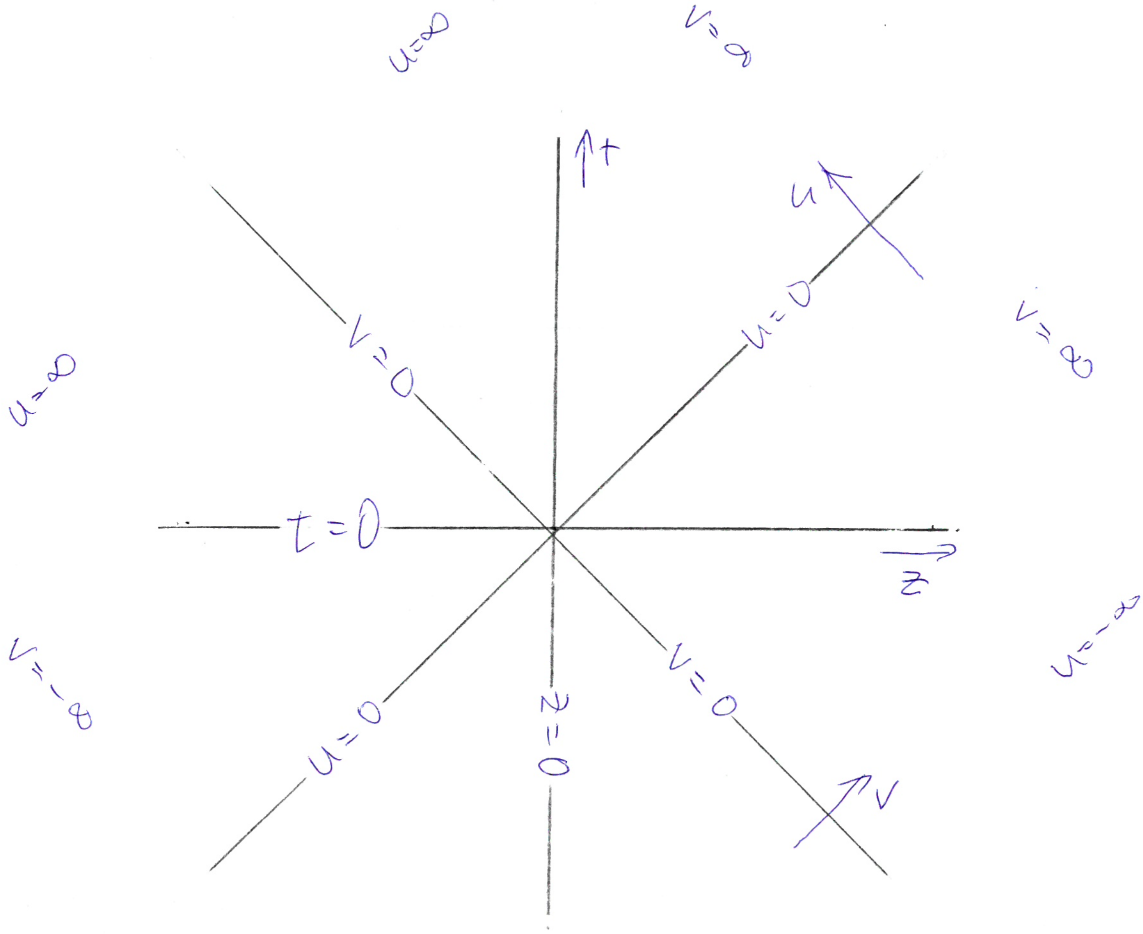
Killingův vekt. boostu

$$\xi = \frac{\partial}{\partial\tau} = z\frac{\partial}{\partial t} + t\frac{\partial}{\partial z} = v\frac{\partial}{\partial v} - u\frac{\partial}{\partial u} = \frac{\partial}{\partial V} + \frac{\partial}{\partial U}$$

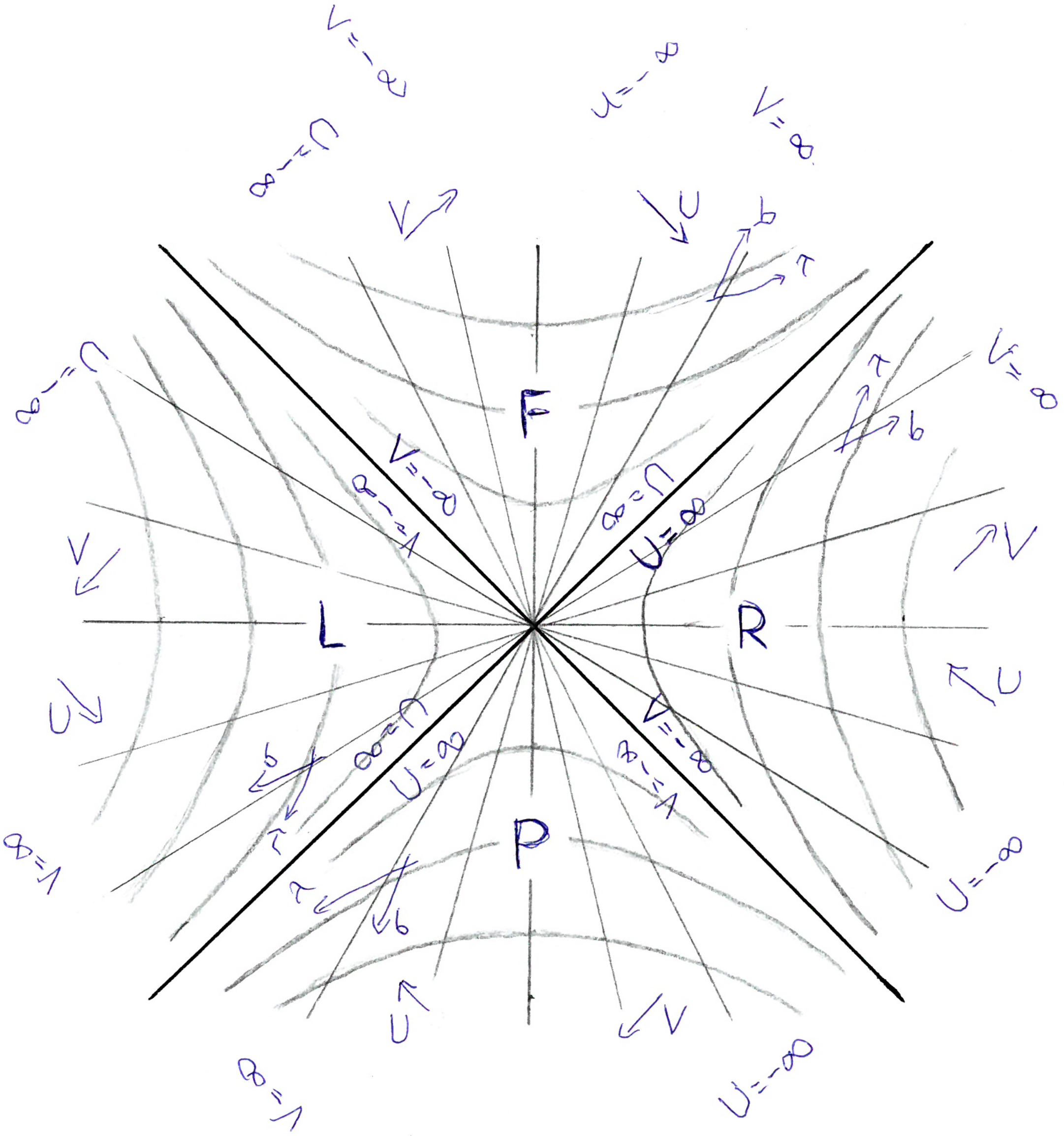
metrika

$$g = -dt^2 + dz^2 + dx^2 + dy^2 = \overbrace{\mp b^2 d\tau^2 \pm db^2}^{R,L/F,P} + dx^2 + dy^2$$
$$= -\frac{1}{2} du \vee dv + dx^2 + dy^2 = \frac{1}{2} s_u s_v b^2 dU \vee dV + dx^2 + dy^2$$

$$\Box\phi = \left[-\frac{\partial^2}{\partial t^2} + \frac{\partial^2}{\partial z^2} + \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right]\phi = \left[-4\frac{\partial}{\partial u}\frac{\partial}{\partial v} + \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right]\phi \qquad \mathcal{F} = [-\Box + m^2]$$



u=∞
v=∞
t
u
v=0
u=0
u=∞
t=0
z
v=∞
u=−∞
v=−∞
u=0
z=0
v=0
v

V=−∞
u=−∞
V=∞
U=−∞
V
U
b
τ
F
L
R
P
V=−∞
U=∞
V=∞
U=−∞