Reprezentace L.G. a L.A. na vektorovém prost. V

Def $T \quad G \to \mathrm{Lin}\, V \qquad g \to T_g \in V^1_1$

$$T_{gh} = T_g \cdot T_h \qquad T_{gh}{}^{A}{}_{B} = T_g{}^{A}{}_{M}\, T_h{}^{M}{}_{B}$$

Def $t \quad \mathfrak{g} \to \mathrm{Lin}\, V \qquad m \to t_m \in V^1_1$

$$t_{[m,n]} = [t_m, t_n] = t_m t_n - t_n t_m$$

$$t_m{}^{A}{}_{B} = m^{\alpha}\, t_{\alpha}{}^{A}{}_{B}$$

$$c_{\kappa\gamma}{}^{\alpha}\, t_{\alpha}{}^{K}{}_{L} = t_{\kappa}{}^{K}{}_{N}\, t_{\gamma}{}^{N}{}_{L} - t_{\gamma}{}^{K}{}_{M}\, t_{\kappa}{}^{M}{}_{L}$$

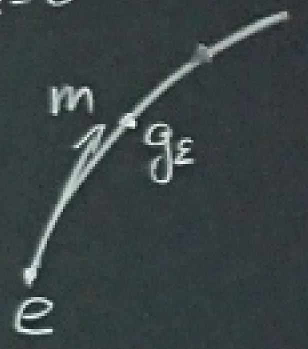
$e + \varepsilon m \qquad T_{e+\varepsilon m} = \delta + \varepsilon t_m$

Def

T repr. LG na V

t generátor této repr.

$$t_m = \frac{d}{d\varepsilon} T_{g_\varepsilon}\Big|_{\varepsilon=0}$$



$$T_{\exp m} = \exp t_m$$

$$T_{\exp 0} = \delta$$

$$\frac{d}{d\varepsilon} T_{\exp(\varepsilon m)}\Big|_{\varepsilon=\varepsilon_0} = \frac{d}{d\varepsilon} T_{\exp(\varepsilon m)}\Big|_{\varepsilon=0} T_{\exp \varepsilon_0 m}$$

$$= t_m \cdot T_{\exp(\varepsilon_0 m)}$$

$$\Rightarrow T_{\exp \varepsilon m} = \exp(\varepsilon t_m)$$

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$\downarrow$

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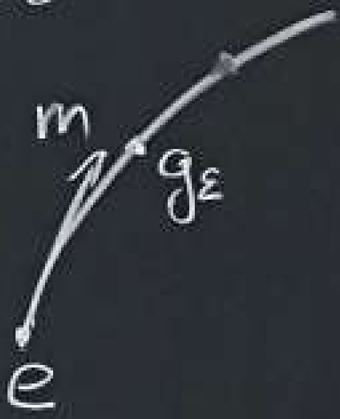

Def

T repr. LG na V

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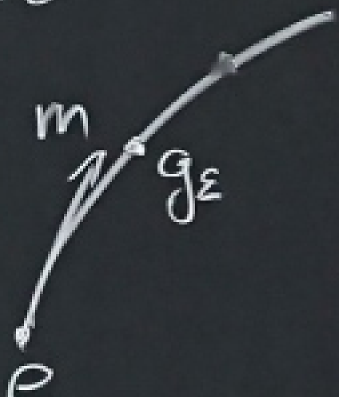

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$$\frac{d}{d\varepsilon} T_{\exp(\varepsilon m)}\Big|_{\varepsilon=\varepsilon_0} = \frac{d}{d\varepsilon} T_{\exp(\varepsilon m)}\Big|_{\varepsilon=0} T_{\exp \varepsilon_0 m}$$

$$= t_m \cdot T_{\exp(\varepsilon_0 m)}$$

$$\Rightarrow T_{\exp \varepsilon m} = \exp(\varepsilon t_m)$$

$$[a,b] = \frac{D}{d\tau}\left[\exp(\sqrt{\tau}\,a)\exp(\sqrt{\tau}\,b)\exp(-\sqrt{\tau}\,a)\exp(-\sqrt{\tau}\,b)\right]\Big|_{\tau=0}$$

$$\frac{d}{d\tau} T_{\exp(\sqrt{\tau}a)\exp(\sqrt{\tau}b)\exp(-\sqrt{\tau}a)\exp(-\sqrt{\tau}b)}\Big|_{\tau=0} = t_{[a,b]} \stackrel{?}{=} [t_a, t_b]$$

$$T_{\exp(\sqrt{\tau}a)} = \exp(t_{\sqrt{\tau}a}) = \delta + \sqrt{\tau}\,t_a + \tfrac{1}{2}\tau\,t_a^2 + \dots$$

$$(\delta + \sqrt{\tau}t_a + \tfrac{1}{2}\tau t_a^2 + \dots)(\delta + \sqrt{\tau}t_b + \tfrac{1}{2}\tau t_b^2 + \dots)(\delta - \sqrt{\tau}t_a + \tfrac{1}{2}\tau t_a^2 + \dots)(\delta - \sqrt{\tau}t_b + \tfrac{1}{2}\tau t_b^2 + \dots) =$$

$$= \delta + \sqrt{\tau}(\cancel{t_a + t_b - t_a - t_b})$$

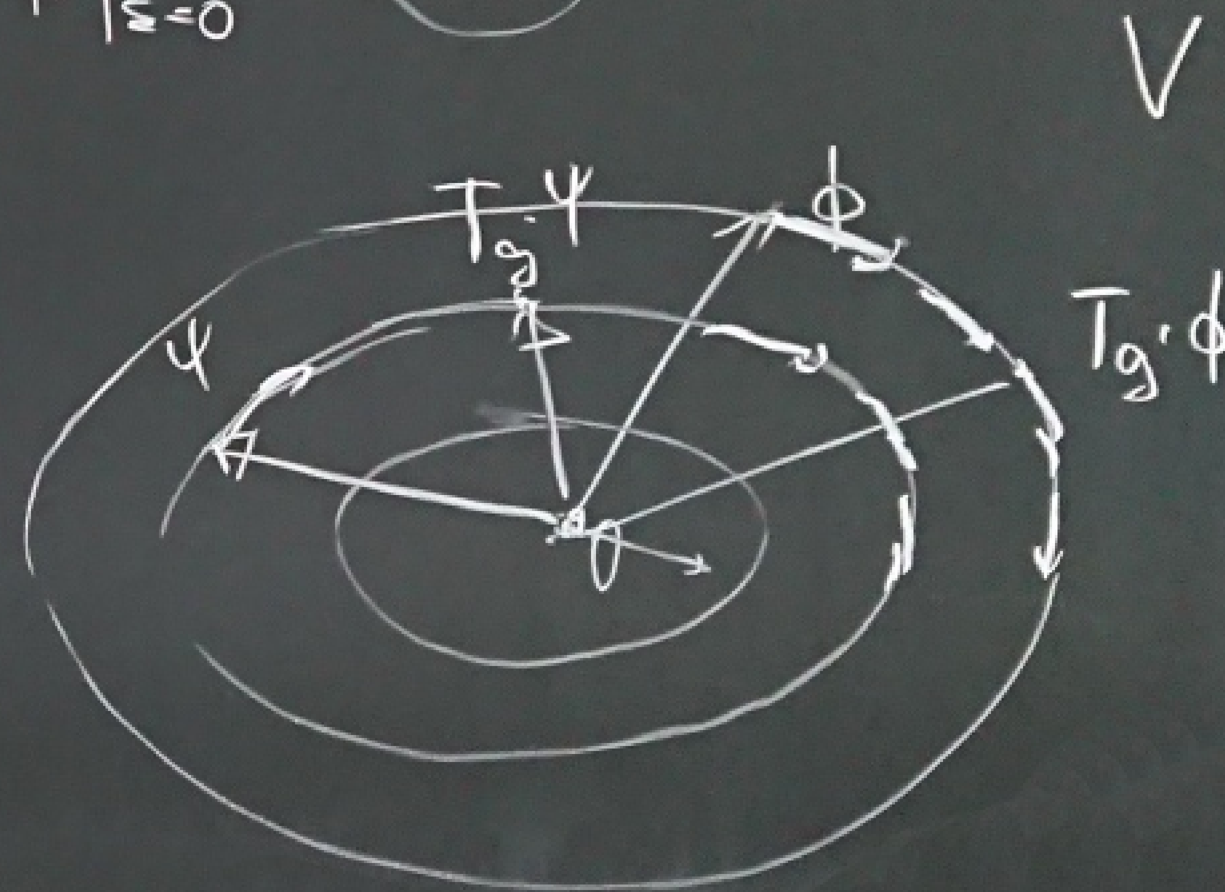
$$+ \tau(\cancel{t_a^2} + \cancel{t_b^2} + t_a \cdot t_b - \cancel{t_a} t_b - t_b \cdot t_a + \cancel{t_a} t_b) = \tau[t_a, t_b]$$

$$t_{[a,b]} = [t_a, t_b]$$

T представл. L.G. на V

$g \quad T_g \qquad \phi \to T_g \cdot \phi \qquad \phi^{\underline{A}} = T_g{}^{\underline{A}}{}_{\underline{B}} \phi^{\underline{B}}$

$m \to t_m \qquad t_m|_\phi = \frac{D}{d\varepsilon} T_{g_\varepsilon} \cdot \phi \big|_{\varepsilon=0} = t_m \cdot \phi$



T репр. L.G. на V

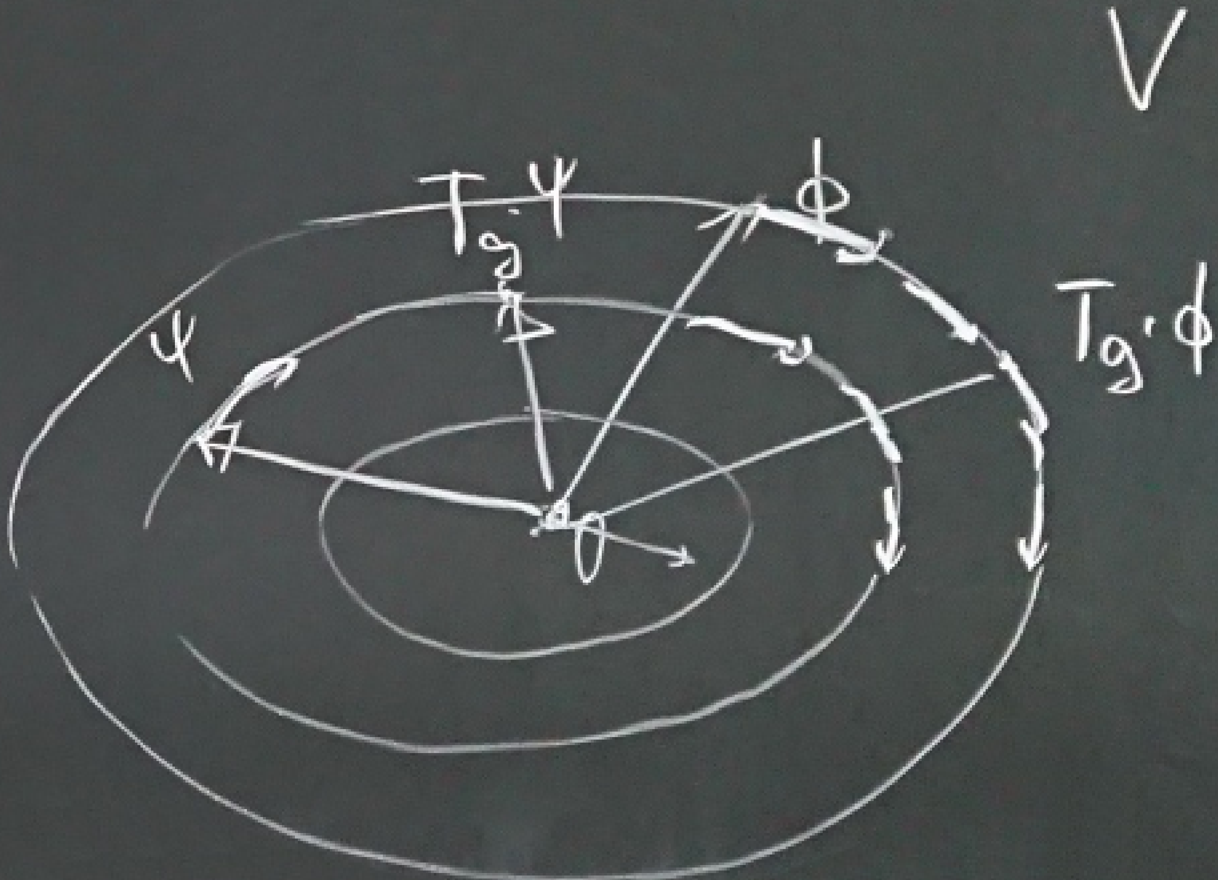
$$g \qquad T_g \qquad\qquad \phi \to T_g \cdot \phi \qquad\qquad \phi^{\underline{A}} = T_g{}^{\underline{A}}{}_{\underline{B}}\, \phi^{\underline{B}}$$

$$m \to t_m \qquad\qquad t_m\big|_\phi = \frac{d}{d\varepsilon} T_{g_\varepsilon} \cdot \phi\,\Big|_{\varepsilon=0} = t_m \cdot \phi$$

T repr. L.G. on V

$g \qquad T_g \qquad \phi \to T_g \cdot \phi \qquad \phi^{A} = {T_g}^{A}{}_{B}\, \phi^{B}$

$m \to t_m \qquad t_m\big|_\phi = \frac{D}{d\varepsilon} T_{g_\varepsilon} \cdot \phi \Big|_{\varepsilon=0} = t_m \cdot \phi$


V
$T_g \cdot \psi$
ϕ
$T_g \cdot \phi$
ψ
0