gravitace

$$g_{mn} \to \nabla_n \to R_{mn}{}^k{}_l$$

$$S_{GR}[g] = \frac{1}{2\varkappa}\int_\Omega (R - 2\Lambda)\, g^{\frac{1}{2}}$$

$$S = S_{GR} + S_{ost.}(\ldots, g)$$

$$\frac{\delta S}{\delta g} = 0 \qquad \frac{2}{g^{\frac{1}{2}}}\frac{\delta S_{GR}}{\delta g^{-1}} = -\frac{1}{\varkappa}\left(Ric - \frac{1}{2}Rg + \Lambda g\right)$$

$$Ric - \frac{1}{2}Rg + \Lambda g = \varkappa T \qquad \nabla_m T^{mn} = 0$$

$$T = -\frac{2}{g^{\frac{1}{2}}}\frac{\delta S_{ost}}{\delta g^{-1}}$$

$$g \to g + \delta g \qquad \delta g_{mn} = \nabla_{(m}\xi_{n)} \qquad \delta S_{GR} = \int \frac{\delta S_{GR}}{\delta g}\delta g$$

skal. pole

$$\phi(x) \qquad d_n\phi$$

$$S_{sp}[\phi, g] = -\frac{1}{2}\int_\Omega \left(d_m\phi\, g^{mn} d_n\phi + m^2\phi^2\right) g^{\frac{1}{2}}$$

$$S_{spI}[\phi, g] = -\int_\Omega U(\phi)\, g^{\frac{1}{2}}$$

$$S[\phi, g] = -\frac{\xi}{2}\int_\Omega R\phi^2 g^{\frac{1}{2}}$$

$$\frac{\delta S_{sp}}{\delta\phi} = -g^{\frac{1}{2}}\left[-\underbrace{\Box}_{\nabla_m g^{mn}\nabla_n} + m^2\right]\phi$$

$$\frac{1}{g^{\frac{1}{2}}}\frac{\delta S_{ost}}{\delta\phi} = J \qquad \left[-\Box + m^2\right]\phi = J$$

$$T_{sp} = d\phi\, d\phi - \frac{1}{2}g\left(d\phi \cdot g^{-1} \cdot d\phi + m^2\phi^2\right)$$

kalibrační a látková pole

GM lokální kal. grupa

gM lokální kal. algebra

$C_{\mu\nu}{}^{\kappa}$ $\quad k_{\alpha\beta}$

D kalibrační pole

kov. der. na gM $\quad Dc = 0$

AM asoc. vekt. bundle

$T_{m}{}^{A}{}_{B}$ $\quad t_m{}^A{}_B = m^\alpha t_\alpha{}^A{}_B$

H_{AB} metr. (sk. součin)

$t_m^+ = -t_m$

Φ^A látkové pole $\in \mathrm{Sect}\, AM$

gravitace

$$g_{\underline{mn}} \to \nabla_{\underline{n}} \to R_{\underline{mn}}{}^{\underline{k}}{}_{\underline{l}}$$

$$S_{GR}[g] = \frac{1}{2\varkappa}\int_{\Omega} (R - 2\Lambda)\, g^{\frac{1}{2}}$$

$$S = S_{GR} + S_{ext.}(\ldots, g)$$

$$\frac{\delta S}{\delta g} = 0 \qquad \frac{2}{g^{\frac{1}{2}}}\frac{\delta S_{GR}}{\delta g^{-1}} = -\frac{1}{\varkappa}\left(Ric - \frac{1}{2}Rg + \Lambda g\right)$$

$$Ric - \frac{1}{2}Rg + \Lambda g = \varkappa T \qquad \nabla_m T^{mn} = 0$$

$$T = -\frac{2}{g^{\frac{1}{2}}}\frac{\delta S_{ext}}{\delta g^{-1}}$$

$$g \to g + \delta g \qquad \delta g_{\underline{mn}} = \nabla_{(m}\xi_{n)} \qquad \delta S_{GR} = \int \frac{\delta S_{GR}}{\delta g}\delta g$$

Skal. pole

$\phi(x) \qquad d_{\underline{m}}\phi$

$$S_{SP}[\phi, g] = -\frac{1}{2}\int_{\Omega} \left(d_{\underline{m}}\phi\, g^{mn} d_{\underline{n}}\phi + m^2\phi^2\right) g^{\frac{1}{2}}$$

$$S_{SPI}[\phi, g] = -\int_{\Omega} U(\phi)\, g^{\frac{1}{2}}$$

$$S[\phi, g] = -\frac{\xi}{2}\int_{\Omega} R\,\phi^2 g^{\frac{1}{2}}$$

$$\frac{\delta S_{SP}}{\delta\phi} = -g^{\frac{1}{2}}\left[-\underbrace{\Box}_{\nabla_{\underline{m}} g^{mn}\nabla_{\underline{n}}} + m^2\right]\phi$$

$$\frac{1}{g^{\frac{1}{2}}}\frac{\delta S_{int}}{\delta\phi} = J \qquad \left[-\Box + m^2\right]\phi = J$$

$$T_{SP} = d\phi\, d\phi - \frac{1}{2} g\left(d\phi \cdot g^{-1} \cdot d\phi + m^2\phi^2\right)$$

Kalibrační a látková pole

GM lokální kal. grupa

gM lokální kal. algebra

$c_{\mu\nu}{}^{\kappa}$ $k_{\alpha\beta}$

D kalibrační pole

kov. der. na gM $Dc = 0$

AM asoc. vekt. bundle

$T_{h}{}^{\underline{A}}{}_{\underline{B}}$ $t_m{}^{\underline{A}}{}_{\underline{B}} = m^{\alpha} t_{\underline{\alpha}}{}^{\underline{A}}{}_{\underline{B}}$

$H_{\underline{AB}}$ metr. (sk. součin)

$t_m^{+} = -t_m$

$\Phi^{\underline{A}}$ látkové pole $\in \mathrm{Sect}\, AM$