$$\mathbb{R}^{d} \xrightarrow[\text{fields}]{\text{ч}} \mathbb{R} \Supset {}^{x}\text{ч}$$

$${}^{x}\boxed{\text{ч}:} = {}^{x}\boxed{{}^{x}\text{ч}:{}^{x}_{\mu\_}\text{ч}} = {}^{x}\begin{cases} {}^{x}\text{ч} \\ {}^{x}_{\mu\_}\text{ч} \end{cases} = \frac{1}{2}\eta^{\mu\nu}\, {}^{x}_{\mu\_}\text{ч}\, {}^{x}_{\nu\_}\text{ч} - \mathcal{V}_{{}^{x}\text{ч}}$$

$$\mathbb{R}^{1:d} \xrightarrow{\varphi} {}^{N}\mathbb{R}$$

$$\{\varphi\} = \frac{\partial_{\mu}\varphi\eta^{\mu\nu}\partial_{\nu}\varphi}{2} - \mathcal{V}(\varphi)$$

constant solutions

$$\underline{\mathcal{V}}_{v} = 0$$

$$\underline{\underline{\mathcal{V}}}_{v} = m^{2} \implies \text{min=vac}$$

$$\varphi$$

$$d\varphi$$

$$\mathcal{L}_{0}\left(\varphi\dot{\varphi}\right) = \frac{\dot{\varphi} \divideontimes \dot{\varphi} - m^{2}\varphi \divideontimes \varphi}{2}$$

$$\mathcal{L}_{0}(\varphi) = \frac{d\varphi \divideontimes d\varphi - m^{2}\varphi \divideontimes \varphi = \mathfrak{d}\varphi \divideontimes \mathfrak{d}\varphi - m^{2}\varphi^{2}}{2}$$

$$\mathcal{L}_{0}\left(\varphi\dot{\varphi}\right) = \frac{\dot{\varphi} \divideontimes \dot{\varphi} - m^{2}\varphi^{2}}{2} + g\frac{\varphi^{4}}{4!}$$

$$\mathcal{L}_{0}(\varphi) = \frac{d\varphi \divideontimes d\varphi - m^{2}\varphi \divideontimes \varphi}{2} = \frac{\mathfrak{d}\varphi \divideontimes \mathfrak{d}\varphi - m^{2}\varphi^{2}}{2} + g\frac{\varphi^{4}}{4!}$$

$$\dot{\varphi} \divideontimes \dot{\varphi} = \dot{\varphi}_{\mu}\, g^{\mu\nu}(\varphi)\, \dot{\varphi}_{\nu}$$

$$\mathcal{L}_{0}\left(\varphi\dot{\varphi}_{\mu}\right) = \frac{\dot{\varphi}_{\mu}g^{\mu\nu}(\varphi)\,\dot{\varphi}_{\nu} - m^{2}\varphi \divideontimes \varphi}{2}$$

$$d\varphi = \partial_{\mu}\varphi\, d\,x^{\mu} = {}_{\mu}\underline{\Lsh}\,\varphi\,\underline{\Rsh}^{\mu}$$

$$d\varphi \divideontimes d\varphi = \partial_{\mu}\varphi\, g^{\mu\nu}\varphi\,\partial_{\nu}\varphi = {}_{\mu}\underline{\Lsh}\,\varphi\, g^{\mu\nu}\varphi\, {}_{\nu}\underline{\Lsh}\,\varphi$$

$$\mathcal{L}_{0}(\varphi) = \frac{\partial_{\mu}\varphi g^{\mu\nu}\varphi\partial_{\nu}\varphi - m^{2}\varphi^{2}}{2} = \frac{{}_{\mu}\underline{\Lsh}\varphi g^{\mu\nu}\varphi\, {}_{\nu}\underline{\Lsh}\varphi - m^{2}\varphi^{2}}{2}$$