$$\bar{\mathsf{h}}_0^{d} \subset \bar{\mathsf{h}}^{1:d} \text{ spacetime}$$

$$\bar{\mathsf{h}} \underset{\infty}{\triangle} \text{Ч} \text{ fields}$$

$$\mathsf{h}\times\underline{\text{Ч}}^{\varphi} = \underline{\mathsf{h}\times\text{Ч}}_{\varphi_{\mathsf{h}}}$$

$$\frac{\mathsf{h}{:}\varphi{:}\Phi}{\mathsf{h}\in\bar{\mathsf{h}}:\quad \varphi\in\mathsf{h}\times\text{Ч}:\quad \mathsf{h}\times\underline{\bar{\mathsf{h}}} \xrightarrow[\text{lin}]{\Phi} \underline{\mathsf{h}\times\text{Ч}}_{\varphi}} \xrightarrow[\text{Lag}]{\mathcal{L}} \mathbb{R}$$

$$\mathsf{h}{:}\varphi{:}\Phi \mapsto {}^{\varphi:\Phi}_{\mathsf{h}}\mathcal{L}$$

$$\underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{p:q}{\mathbb{R}}}$$

$$\mathcal{L}\in \underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{0:1+d}{\mathbb{R}}} \text{ density}$$

$${}^{\mathsf{h}}\mathcal{L}_{\varphi} = {}^{{}^{\mathsf{h}}\varphi:{}^{\mathsf{h}}\underline{\varphi}}\mathcal{L}_{\mathsf{h}}$$

$$\underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{p:q+1}{\mathbb{R}}} \xleftarrow{d} \underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{p:q}{\mathbb{R}}}$$

$$\underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{p:q}{\mathbb{R}}} \xrightarrow{D} \underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{\acute{p}:\acute{q}}{\mathbb{R}}}$$

$$\underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{p:q}{\mathbb{R}}} \xrightarrow{\partial} \underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{p+1:q}{\mathbb{R}}}$$

$$\mathsf{h}\times\overbrace{\underline{\text{Ч}}^{\varphi}} \xrightarrow[\text{lin}]{\underline{D}\mathcal{L}} \mathsf{h}\times\mathbb{R}$$

$$\underline{D}\,\mathcal{L} = \partial\mathcal{L} + d\gamma \in \underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{1:1+d}{\mathbb{R}}}$$

$$\gamma \in \underbrace{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\underset{\infty}{\triangle}\underbrace{\underline{\bar{\mathsf{h}}\underset{\infty}{\triangle}\text{Ч}\times\bar{\mathsf{h}}}\,\triangle\,\overset{1:d}{\mathbb{R}}}$$

$$\Omega = \partial\gamma \in \underbrace{{}^{\hbar}\lrtriangle_{\infty}\,\text{ч}\times\hbar}\lrtriangle_{\infty}\underbrace{\overline{{}^{\hbar}\lrtriangle_{\infty}\,\text{ч}\times\hbar}\lrtriangle\,\mathbb{R}^{2:d}}$$

$$\omega = \int^{\hbar_0} \Omega \in \underbrace{{}^{\hbar}\lrtriangle_{\infty}\,\text{ч}}\lrtriangle_{\infty}\underbrace{\overline{{}^{\hbar}\lrtriangle_{\infty}\,\text{ч}}\lrtriangle\,\mathbb{R}^{2}}\ \text{sympl}$$

$$T\times{}^{T}\lrtriangle_{\infty}\mathsf{I}\ \xrightarrow[\text{coord}]{t^i:q^j_\alpha:|\alpha|\leqslant k}\mathbb{R}$$

$$^{\psi}q^j_\alpha = \partial_\alpha\left(\psi \rtimes q^j\right)$$

$$d\,t^i = D\,t^i$$

$$\delta\,t^i = 0$$

$$\delta\,q^j_\alpha = \delta\,q^j_\alpha$$

$$D\,q^j_\alpha = \begin{cases} dt^i q^j_{\alpha+\varepsilon_i} & |\alpha| < k \\ 0 & |\alpha| = k \end{cases}$$

$$DF = d\,t^i\left(\frac{\partial F}{\partial t^i} + \frac{\partial F}{\partial q^j_\alpha}q^j_{\alpha+\varepsilon_i}\right)$$

$$\delta F = \frac{\partial F}{\partial q^j_\alpha}\delta\,q^j_\alpha$$

$$dF = \frac{\partial F}{\partial t^i}d\,t^i + \frac{\partial F}{\partial q^j_\alpha}d\,q^j_\alpha = \frac{\partial F}{\partial t^i}d\,t^i + \frac{\partial F}{\partial q^j_\alpha}\underbrace{Dq^j_\alpha + \delta q^j_\alpha} = \frac{\partial F}{\partial t^i}d\,t^i + \frac{\partial F}{\partial q^j_\alpha}\underbrace{dt^i q^j_{\alpha+\varepsilon_i} + \delta q^j_\alpha}$$

$$= \underbrace{dt^i\overbrace{\frac{\partial F}{\partial t^i} + \frac{\partial F}{\partial q^j_\alpha}q^j_{\alpha+\varepsilon_i}}}_{=DF} + \underbrace{\frac{\partial F}{\partial q^j_\alpha}\delta q^j_\alpha}_{=\delta F}$$

$$\delta \underbrace{\mathcal{L} dt} = \underset{\text{source}}{E} + D \underset{0:1}{M} \Rightarrow M = -\frac{\partial \mathcal{L}}{\partial \dot{q}^j} \delta q^j$$

$$E = \underbrace{\frac{\partial \mathcal{L}}{\partial q^j} - \partial_t \frac{\partial \mathcal{L}}{\partial \dot{q}^j}} \delta q^j \wedge dt$$

$$D\left(\frac{\partial \mathcal{L}}{\partial \dot{q}^j}\delta q^j\right) = D\frac{\partial \mathcal{L}}{\partial \dot{q}^j} \times \delta q^j + \frac{\partial \mathcal{L}}{\partial \dot{q}^j} D\delta q^j = \partial_t \frac{\partial \mathcal{L}}{\partial \dot{q}^j} dt \times \delta q^j - \frac{\partial \mathcal{L}}{\partial \dot{q}^j} \delta D q^j$$

$$= \partial_t \frac{\partial \mathcal{L}}{\partial \dot{q}^j} dt \times \delta q^j - \frac{\partial \mathcal{L}}{\partial \dot{q}^j} \delta \underbrace{dt \times \dot{q}^j} = \partial_t \frac{\partial \mathcal{L}}{\partial \dot{q}^j} dt \times \delta q^j - \frac{\partial \mathcal{L}}{\partial \dot{q}^j} dt \times \delta \dot{q}^j$$

$$\delta \underbrace{\mathcal{L} dt} = d \underbrace{\mathcal{L} dt} = \underbrace{d\mathcal{L}} \times dt = \left(\frac{\partial \mathcal{L}}{\partial t} dt + \frac{\partial \mathcal{L}}{\partial q^j} dq^j + \frac{\partial \mathcal{L}}{\partial \dot{q}^j} d\dot{q}^j\right) \times dt$$

$$= \overbrace{\frac{\partial \mathcal{L}}{\partial q^j} \underbrace{Dq^j + \delta q^j} + \frac{\partial \mathcal{L}}{\partial \dot{q}^j} \underbrace{D\dot{q}^j + \delta \dot{q}^j}} \times dt = \overbrace{\frac{\partial \mathcal{L}}{\partial q^j} \underbrace{dt \dot{q}^j + \delta q^j} + \frac{\partial \mathcal{L}}{\partial \dot{q}^j} \delta \dot{q}^j} \times dt$$

$$\Rightarrow \delta \underbrace{\mathcal{L} dt} + D\left(\frac{\partial \mathcal{L}}{\partial \dot{q}^j} \delta q^j\right) = \underbrace{\frac{\partial \mathcal{L}}{\partial q^j} - \partial_t \frac{\partial \mathcal{L}}{\partial \dot{q}^j}} \delta q^j \wedge dt$$