

$$\mathbf{t} = \mathbb{R}^{1:d} i$$

$$\sigma \in 0|\ell$$

$${}^{0:\tau}_1 X^\mu = 0 = {}^{\ell:\tau}_1 X^\mu$$

$$0|\ell \begin{array}{c} \triangleleft_{\infty} \mathbf{t} \mathbf{x} \mathbb{R} \\ \xrightarrow{\frac{\sigma(\tau)^\mu}{\sigma(\tau)^\mu}} \mathbb{R} \\ \triangleleft_0 \end{array}$$

$$0|\ell \mathbf{x} \mathbb{R} \begin{array}{c} \triangleleft_{\infty} \mathbb{R}^{1:d} \\ \Rightarrow \end{array} {}^{\sigma\tau} X$$

$$S(X) = -\frac{1}{4\pi\alpha'} \int_{d\sigma} \int_{d\tau} \sqrt{-\gamma} \gamma^{\alpha\beta} \partial_\alpha X^\mu \eta_{\mu\nu} \partial_\beta X^\nu$$

$${}^{\sigma\tau} \overline{\mathcal{L}(X)} = -\frac{1}{4\pi\alpha'} \overline{\partial_\alpha X^\mu} \eta^{\alpha\beta} \eta_{\mu\nu} \overline{\partial_\beta X^\nu}$$

$${}^{\tau\sigma} \overline{\mathcal{L}(X)} = -\frac{1}{4\pi\alpha'} \overline{\partial_\alpha X^\mu} \eta^{\alpha\beta} \eta_{\mu\nu} \overline{\partial_\beta X^\nu}$$

$$4\pi\alpha' \overline{{}^\sigma \mathcal{L}(\tau)} = -\overline{{}^\sigma_\alpha(\tau)^\mu} \eta^{\alpha\beta} \eta_{\mu\nu} \overline{{}^\sigma_\beta(\tau)^\nu} = \overline{{}^\sigma_0(\tau)^\mu} \eta_{\mu\nu} \overline{{}^\sigma_0(\tau)^\nu} - \overline{{}^\sigma_1(\tau)^\mu} \eta_{\mu\nu} \overline{{}^\sigma_1(\tau)^\nu} = \overline{{}^e_0(\tau)^\mu} \eta_{\mu\nu} \overline{{}^\sigma_0(\tau)^\nu} - \overline{{}^e_1(\tau)^\mu} \eta_{\mu\nu} \overline{{}^\sigma_1(\tau)^\nu}$$

$$\overline{{}^e_0(\tau)^\mu} \overline{{}^\sigma_1(\tau)^\nu} = -2\pi i \alpha' \eta^{\mu\nu} \overline{{}^e_0(\tau)^\sigma}$$

$${}^\mu(\tau)_e = \frac{\partial \mathcal{L}}{\partial \overline{{}^e_0(\tau)^\mu}} = \frac{1}{2\pi\alpha'} \eta_{\mu\nu} \overline{{}^\sigma_0(\tau)^\nu} \delta_e$$

$$i_\mu(\tau)_e \overline{{}^\sigma_1(\tau)^\nu} = \overline{{}^\sigma_\mu(\tau)^\nu} \delta_e$$