$$\mathsf{L}^{1}\cdots\mathsf{L}^{k}\,{}^{z}\underline{\Delta_w^{-\lambda}}_{k} = {}^{z}\Delta_w^{-\lambda}\sum_{\mathcal{I}}^{\text{part}}\lambda^{|\mathcal{I}|}\prod_{I}^{\mathcal{I}}\frac{1}{|I|}\sum_{\pi}^{I!}\overbrace{\mathsf{L}^{\pi_1}\overset{*}{w}{}^{z}\cdots\overset{*}{w}{}^{z}\mathsf{L}^{\pi_{|I|}}}\bowtie w^{z}$$

$$\mathsf{L}^{1}\,{}^{z}\underline{\Delta_w^{-\lambda}} = (-\lambda)\,{}^{z}\Delta_w^{-\lambda-1}\,\underbrace{-\mathsf{L}^{1}\overset{*}{w}}\,{}^{1-z\overset{*}{w}}\underline{\det} = (-\lambda)\,{}^{z}\Delta_w^{-\lambda-1}\,{}^{z}B_w\ \operatorname{tr}\ \underbrace{-\mathsf{L}^{1}\overset{*}{w}}\,\overline{1-z\overset{*}{w}}^{-1}$$

$$= \lambda\,{}^{z}\Delta_w^{-\lambda}\ \operatorname{tr}\ \mathsf{L}^{1}\,\overset{*}{\overbrace{\underbrace{1-w\overset{*}{z}}_{-1}w}} = \lambda\,{}^{z}\Delta_w^{-\lambda}\,\mathsf{L}^{1}\bowtie\overbrace{\underbrace{1-w\overset{*}{z}}_{-1}w} = \lambda\,{}^{z}\Delta_w^{-\lambda}\,\mathsf{L}^{1}\bowtie w^{z}$$

$$\underbrace{\mathsf{L}^{k}\cdot\cdot\mathsf{L}^{0}}\,{}^{0}_{1+k}\mathfrak{g}_{\underline{\ }w} = \underbrace{\mathsf{L}^{k}\cdot\cdot\mathsf{L}^{1}}\,{}^{0}\underline{\mathsf{L}^{0z}\mathfrak{g}_{\underline{\ }w}}_{k} = \underbrace{\mathsf{L}^{k}\cdot\cdot\mathsf{L}^{1}}\,{}^{0}\underline{\mathsf{L}^{0z}B_{-w}^{-1}}_{k}\,{}^{w}B_w^{1/2}\underset{z=0}{=}\sum_{\pi}^{(1+k)!}\underbrace{\mathsf{L}^{\pi_0}\overset{*}{w}\cdots\overset{*}{w}\mathsf{L}^{\pi_k}}\,{}^{w}B_w^{1/2}$$

$$\mathsf{L}^{k+1}\,{}^{0}_{1+k}\mathfrak{g}_{\underline{\ }w} = (1+k)!\,\underbrace{\mathsf{L}\overset{*}{w}\cdots\overset{*}{w}\mathsf{L}}_{k+1}\,{}^{w}B_w^{1/2} = (1+k)!\,\underbrace{\mathsf{L}\,\overbrace{{}^{w}B_w^{1/2}}\,\overbrace{\overset{*}{w}{}^{w}}\cdots\overbrace{\overset{*}{w}{}^{w}}\,\overbrace{\mathsf{L}\,{}^{w}B_w^{1/2}}}_{k+1}$$

$$\mathsf{L}^{n}\,{}^{0}\underline{\Delta_{-w}^{-\nu}\,{}^{\mathfrak{g}_w}\urcorner}_{n} = \sum_{0\leqslant m\leqslant n}\begin{bmatrix}n\\ m\end{bmatrix}\overbrace{\mathsf{L}^{n-m}\,{}^{0}\underline{\Delta_{-w}^{-\nu}}_{n-m}}\,\overbrace{\mathsf{L}^{m}\,{}^{0}\underline{\mathfrak{g}_w\urcorner}_{m}}$$

$$= \sum_{0\leqslant m\leqslant n}\begin{bmatrix}n\\ m\end{bmatrix}\overbrace{\mathsf{L}^{n-m}\,{}^{0}\underline{\Delta_{-w}^{-\nu}}_{n-m}}\,m!\sum_{1\leqslant k\leqslant m}\sum_{|\beta|=m}^{\mathbb{N}_>^k}\underbrace{\overbrace{\mathsf{L}^{\beta_1}\,{}^{0}_{\beta_1}\mathfrak{g}_{\underline{\ }w}}\boxtimes\cdots\boxtimes\overbrace{\mathsf{L}^{\beta_k}\,{}^{0}_{\beta_k}\mathfrak{g}_{\underline{\ }w}}}\,{}^{w}_{k-}\urcorner$$

$$= {}^{w_2}\urcorner_2\sum_{0\leqslant m\leqslant n}\begin{bmatrix}n\\ m\end{bmatrix}\overbrace{\mathsf{L}^{n-m}\,{}^{0}\underline{\Delta_{-w_1}^{\nu}}_{n-m}}\,m!\sum_{1\leqslant k\leqslant m}\sum_{|\beta|=m}^{\mathbb{N}_>^k}\underbrace{\overbrace{\mathsf{L}^{\beta_1}\,{}^{0}_{\beta_1}\mathfrak{g}_{\underline{\ }w}}\boxtimes\cdots\boxtimes\overbrace{\mathsf{L}^{\beta_k}\,{}^{0}_{\beta_k}\mathfrak{g}_{\underline{\ }w}}}\,{}^{w_1}_{k-1}\urcorner_1 = {}^{w_2}\urcorner_2\,{}^{0}\overbrace{{}^{\zeta}\mathcal{E}_{\partial_z}^{\ell\cdot\cdot\ell 0\cdot\cdot 0}\,{}^{z}_{T}\mathfrak{g}_{w_1}^{\nu}\,{}^{z}\mathfrak{g}_{w_1}\urcorner_1}$$

$$\mathsf{L}^{\ell}\cdots\mathsf{L}^{1}\,{}^{z}\underline{\mathsf{L}^{0}B_w^{-1}}_{\ell} = \sum_{\pi}^{(1+\ell)!}\mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\pi_\ell}\,{}^{z}B_w^{-1} = \sum_{\pi}^{(0\cup L)!}\mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\pi_\ell}\,{}^{z}B_w^{-1}$$

$$\zeta\,{}^{z}B_w^{-1} = \overline{1-z\overset{*}{w}}^{-1}\,\zeta\,\overline{1-\overset{*}{w}z}^{-1}$$

$$\Rightarrow \mathsf{L}^{1}\,{}^{z}\underline{\mathsf{L}^{0}B_w^{-1}} = \overline{1-z\overset{*}{w}}^{-1}\,\mathsf{L}^{1}\,\overset{*}{w}\,\overline{1-z\overset{*}{w}}^{-1}\,\mathsf{L}^{0}\,\overline{1-\overset{*}{w}z}^{-1} + \overline{1-z\overset{*}{w}}^{-1}\,\mathsf{L}^{0}\,\overline{1-\overset{*}{w}z}^{-1}\,\overset{*}{w}\,\mathsf{L}^{1}\,\overline{1-\overset{*}{w}z}^{-1}$$

$$= \overline{1-z\overset{*}{w}}^{-1}\,\underbrace{\mathsf{L}^{1}\overset{*}{w}^{z}\mathsf{L}^{0}+\mathsf{L}^{0}\overset{*}{w}^{z}\mathsf{L}^{1}}\,\overline{1-\overset{*}{w}z}^{-1} = \underbrace{\mathsf{L}^{1}\overset{*}{w}^{z}\mathsf{L}^{0}+\mathsf{L}^{0}\overset{*}{w}^{z}\mathsf{L}^{1}}\,{}^{z}B_w^{-1}$$

$$\overset{*}{w}^{z} = \overset{*}{\overline{\underbrace{1-w\overset{*}{z}}_{-1}w}} = \overset{*}{w}\,\overline{1-z\overset{*}{w}}^{-1} \Rightarrow \zeta\,{}^{z}\underline{\overset{*}{w}^{z}} = \overset{*}{w}\,\overline{1-z\overset{*}{w}}^{-1}\,\zeta\,\overset{*}{w}\,\overline{1-z\overset{*}{w}}^{-1} = \overset{*}{w}^{z}\,\zeta\,\overset{*}{w}^{z}$$

$$\mathsf{L}^{\ell}\cdots\mathsf{L}^{1}\,{}^{z}\underline{\mathsf{L}^{0}B_w^{-1}}_{\ell} = \mathsf{L}^{\ell}\,{}^{z}\underline{\mathsf{L}^{\ell\text{-}1}\cdots\mathsf{L}^{1}\,{}^{z}\underline{\mathsf{L}^{0}B_w^{-1}}_{\ell\text{-}1}} \underset{\text{ind}}{=} \sum_{\pi}^{\ell!}\mathsf{L}^{\ell}\,{}^{z}\underline{\mathsf{L}^{\pi_0}\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\mathsf{L}^{\pi_{\ell\text{-}1}z}B_w^{-1}}$$

$$= \sum_{\pi}^{\ell!}\mathsf{L}^{\pi_0}\,\overline{\mathsf{L}^{\ell^{z}}\underline{\overset{*}{w}^{z}}}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\pi_{\ell\text{-}1}}\,{}^{z}B_w^{-1} + \mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\cdots\overline{\mathsf{L}^{\ell^{z}}\underline{\overset{*}{w}^{z}}}\,\mathsf{L}^{\pi_{\ell\text{-}1}}\,{}^{z}B_w^{-1} + \mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\pi_{\ell\text{-}1}}\,\overline{\mathsf{L}^{\ell^{z}}\,{}^{z}\underline{B_w^{-1}}}$$

$$= \sum_{\pi}^{\ell!}\begin{cases}\mathsf{L}^{\pi_0}\overset{*}{w}^{z}\mathsf{L}^{\ell}\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\mathsf{L}^{\pi_{\ell\text{-}1}z}B_w^{-1} & +\mathsf{L}^{\pi_0}\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\mathsf{L}^{\ell}\overset{*}{w}^{z}\mathsf{L}^{\pi_{\ell\text{-}1}z}B_w^{-1}\\ +\mathsf{L}^{\ell}\overset{*}{w}^{z}\mathsf{L}^{\pi_0}\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\mathsf{L}^{\pi_{\ell\text{-}1}z}B_w^{-1} & +\mathsf{L}^{\pi_0}\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\mathsf{L}^{\pi_{\ell\text{-}1}}\overset{*}{w}^{z}\mathsf{L}^{\ell}\overset{*}{w}^{z^{z}}B_w^{-1}\end{cases}$$

$$= \sum_{\pi_\ell^{-1}=1}^{(1+\ell)!}\mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\,\mathsf{L}^{\ell}\,\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\pi_{\ell\text{-}1}}\,{}^{z}B_w^{-1} + \sum_{\pi_\ell^{-1}=\ell\text{-}1}^{(1+\ell)!}\mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\ell}\,\overset{*}{w}^{z}\,\mathsf{L}^{\pi_{\ell\text{-}1}}\,{}^{z}B_w^{-1}$$

$$+ \sum_{\pi_\ell^{-1}=0}^{(1+\ell)!}\mathsf{L}^{\ell}\,\overset{*}{w}^{z}\,\mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\pi_{\ell\text{-}1}}\,{}^{z}B_w^{-1} + \sum_{\pi_\ell^{-1}=\ell}^{(1+\ell)!}\mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\pi_{\ell\text{-}1}}\,\overset{*}{w}^{z}\,\mathsf{L}^{\ell}\,{}^{z}B_w^{-1} = \sum_{\pi}^{(1+\ell)!}\mathsf{L}^{\pi_0}\,\overset{*}{w}^{z}\cdots\overset{*}{w}^{z}\,\mathsf{L}^{\pi_\ell}\,{}^{z}B_w^{-1}$$

$$\mathsf{L}^{1}\cdots\mathsf{L}^{n}\,\underset{n}{\underline{\overset{z}{\Delta}{}_w^{-\lambda}\overbrace{\mathsf{L}^{0}B_w^{-1}\ltimes b}}} \;=$$

$$\mathsf{L}^{1}\cdots\mathsf{L}^{n}\,\underset{n}{\underline{\overset{z}{\Delta}{}_w^{-\lambda}\varphi}} = \sum_{I\,\cup\,J}\overbrace{\mathsf{L}^{I}\,\underset{|I|}{\underline{\overset{z}{\Delta}{}_w^{-\lambda}\varphi}}}\overbrace{\mathsf{L}^{J}\,\underset{|J|}{\underline{\overset{z}{\varphi}}}}$$

$$\mathrm{LHS} \;= \sum_{I\,\cup\,J}\overbrace{\mathsf{L}^{i_1}\!\cdot\!\cdot\mathsf{L}^{i_k}\,\underset{k}{\underline{\overset{z}{\Delta}{}_w^{-\lambda}\varphi}}}\overbrace{\mathsf{L}^{j_1}\!\cdot\!\cdot\mathsf{L}^{j_\ell}\,\underset{\ell}{\underline{\overset{z}{\mathsf{L}}{}^{0}B_w^{-1}}}}\ltimes b$$

$$= \sum_{I\,\cup\,J}\overbrace{\sum_{k\,\geqslant\,1}\lambda^{k}\sum_{\mathcal{K}}^{\text{k-part }I}\prod_{K}^{\mathcal{K}}\frac{1}{|K|}\sum_{|K|\,\xrightarrow{\sigma}\,K}\overbrace{\mathsf{L}^{\sigma_1}\overset{*}{w}{}^{z}\cdots\overset{*}{w}{}^{z}\mathsf{L}^{\sigma_{|K|}}}\ltimes w^{z}}\overbrace{\sum_{0\,\cup\,|J|\,\xrightarrow{\tau}\,0\,\cup\,J}\mathsf{L}^{\tau_0}\overset{*}{w}{}^{z}\cdots\overset{*}{w}{}^{z}\mathsf{L}^{\tau_{|J|}}}\ltimes b$$

$$= \sum_{I\,\cup\,J}\;\sum_{0\,\cup\,|J|\,\xrightarrow{\tau}\,0\,\cup\,J}\overbrace{\mathsf{L}^{\tau_0}\overset{*}{w}{}^{z}\cdots\overset{*}{w}{}^{z}\mathsf{L}^{\tau_{|J|}}}\ltimes b\;\sum_{\mathcal{K}}^{\text{I-part}}\;\lambda^{|\mathcal{K}|}\prod_{K}^{\mathcal{K}}\frac{1}{|K|}\sum_{|K|\,\xrightarrow{\sigma}\,K}\overbrace{\mathsf{L}^{\sigma_1}\overset{*}{w}{}^{z}\cdots\overset{*}{w}{}^{z}\mathsf{L}^{\sigma_{|K|}}}\ltimes w^{z}$$

$$\zeta^{z}B_a^{-1} \;=\; \underbrace{1-\zeta\mathring{\overset{*}{a}}}_{-1}\,\zeta\,\underbrace{1-\mathring{a}\zeta}_{-1} \;=\; \sum_{m}^{\mathbb{N}}\sum_{n}^{\mathbb{N}}\;\underbrace{\zeta\overset{*}{\mathring{a}}}_{m}\,\zeta\,\underbrace{\overset{*}{\mathring{a}}\zeta}_{n} \;=\zeta+2\zeta\overset{*}{\mathring{a}}\zeta+3\zeta\overset{*}{\mathring{a}}\zeta\overset{*}{\mathring{a}}\zeta+4\zeta\overset{*}{\mathring{a}}\zeta\overset{*}{\mathring{a}}\zeta\overset{*}{\mathring{a}}\zeta+\cdots$$

$$=\sum_{k}^{\mathbb{N}}k\,\underbrace{\zeta\overset{*}{\mathring{a}}\zeta\overset{*}{\mathring{a}}\cdots\overset{*}{\mathring{a}}\zeta\overset{*}{\mathring{a}}\zeta}_{\sharp\zeta\,=\,k} \;=\sum_{k}^{\mathbb{N}}\underbrace{2k+1}\,\overbrace{Q_{\zeta}Q_{a}}^{k}\,\zeta+2\sum_{k}^{\mathbb{N}}\underbrace{k+1}\,\overbrace{Q_{\zeta}Q_{a}}^{k}\,Q_{\zeta}\,a$$

$$\zeta\,\underset{\ell}{\underline{\overset{z}{\zeta}B_w^{-1}}} = (1+\ell)!\,\underbrace{\zeta\overset{*}{w}{}^{z}\zeta\overset{*}{w}{}^{z}\cdots\overset{*}{w}{}^{z}\zeta\overset{*}{w}{}^{z}\zeta}\,{}^{z}B_w^{-1}$$

$$\sum_{\ell}^{\mathbb{N}}\frac{1}{\ell!}\zeta\,\underset{\ell}{\underline{\overset{z}{\zeta}B_w^{-1}}}\,{}^{z}B_w = \zeta^{\,z+\zeta}B_w^{-1}\,{}^{z}B_w = \zeta^{\,z}B_{w^z}^{-1} = \sum_{k}^{\mathbb{N}}\underbrace{2k+1}\,\overbrace{Q_{\zeta}Q_{w^z}}^{k}\,\zeta+2\sum_{k}^{\mathbb{N}}\underbrace{k+1}\,\overbrace{Q_{\zeta}Q_{w^z}}^{k}\,Q_{\zeta}\,w^{z}$$

$$\Rightarrow\begin{cases}\dfrac{1}{2k!}\zeta\,\underset{2k}{\underline{\overset{z}{\zeta}B_w^{-1z}}}B_w & =\underbrace{2k+1}\,\overbrace{Q_{\zeta}Q_{w^z}}^{k}\zeta\\[2ex] \dfrac{1}{2k+1!}\zeta\,\underset{2k+1}{\underline{\overset{z}{\zeta}B_w^{-1z}}}B_w & =\underbrace{2k+2}\,\overbrace{Q_{\zeta}Q_{w^z}}^{k}Q_{\zeta}w^{z}\end{cases}$$

$$\sum_{\ell}^{\mathbb{N}}\frac{1}{(1+\ell)!}\zeta\,\underset{\ell}{\underline{\overset{z}{\zeta}B_w^{-1}}} = \sum_{\ell}^{\mathbb{N}}\underbrace{\zeta\overset{*}{w}{}^{z}\zeta\overset{*}{w}{}^{z}\cdots\overset{*}{w}{}^{z}\zeta\overset{*}{w}{}^{z}\zeta}\,{}^{z}B_w^{-1} \;=\; \zeta^{w^z}\,{}^{z}B_w^{-1}$$

$$\mathsf{L}^{1}\,{}^{z}\underline{\zeta^{z}B_w^{-1}\mathcal{E}_\omega^{\nu}} = \mathsf{L}^{1}\,{}^{z}\underline{\zeta^{z}B_w^{-1}}^{\;\zeta^{z}B_w^{-1}}\,\underline{\mathcal{E}_\omega^{\nu}} = \underbrace{\mathsf{L}^{1}\overset{*}{w}{}^{z}\zeta+\zeta\overset{*}{w}{}^{z}\mathsf{L}^{1}}\,{}^{z}B_w^{-1\;\zeta^{z}B_w^{-1}}\,\underline{\mathcal{E}_\omega^{\nu}} = \underbrace{\mathsf{L}^{1}\overset{*}{w}{}^{z}\zeta+\zeta\overset{*}{w}{}^{z}\mathsf{L}^{1}}\,{}^{\zeta_z}\,\underline{B_w^{-1}\ltimes\mathcal{E}_\omega^{\nu}}$$

$$\blacktriangleleft \in {}^{Z}\triangle^{n}\mathbb{C} \Rightarrow {}^{z}\blacktriangleleft = \sum_{\mu} {}^{0}\overbrace{{}^{z}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}$$

$$p \bar{\bowtie} q = {}^{0}\overbrace{p_{\partial} q}$$

$$^{z}\blacktriangleleft = \int_{dw/\pi^d}^{Z} {}^{w}\mathfrak{e}_w^{-1}\,{}^{z}\mathfrak{e}_w\,{}^{w}\blacktriangleleft = \sum_{\mu}\int_{dw/\pi^d}^{Z} {}^{w}\mathfrak{e}_w^{-1}\,{}^{z}\mathcal{E}^{\mu}_{w}\,{}^{w}\blacktriangleleft = \sum_{\mu}\int_{dw/\pi^d}^{Z} {}^{w}\mathfrak{e}_w^{-1}\,{}^{w}\bar{\mathcal{E}}^{\mu}_{z}\,{}^{w}\blacktriangleleft = \sum_{\mu}\mathcal{E}^{\mu}_{z}\bar{\bowtie}\blacktriangleleft = \sum_{\mu} {}^{0}\overbrace{{}^{z}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}$$

$$\text{Taylor}\quad {}^{o+z}\blacktriangleleft = \sum_{\mu} {}^{o}\overbrace{{}^{z}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}$$

$$^{o+z}\blacktriangleleft = {}^{z}\overbrace{t_o \ltimes \blacktriangleleft} = \sum_{\mu} {}^{0}\overbrace{{}^{z}\mathcal{E}^{\mu}_{\partial}\underbrace{t_o \ltimes \blacktriangleleft}} \underset{\text{coeff}}{\overset{\text{const}}{=}} \sum_{\mu} {}^{0}\overbrace{t_o \ltimes \underbrace{{}^{z}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}} = \sum_{\mu} {}^{o}\overbrace{{}^{z}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}$$

$$^{z}\overbrace{p_{\partial}\underbrace{{}^{w}_{T}g^{n}\,{}^{wg}\blacktriangleleft}} = \sum_{\mu} p\bar{\bowtie}\overbrace{{}^{z}_{U}g \underset{n}{\rtimes} {}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}$$

$$^{wg}\blacktriangleleft = {}^{\underline{wg-zg}+zg}\blacktriangleleft = \sum_{\mu} {}^{wg-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}$$

$$^{\zeta}\overbrace{{}^{z}\mathfrak{t} \ltimes \underbrace{{}^{w}_{T}g^{n}\,{}^{wg-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}}} = {}^{z+\zeta}\overbrace{{}^{w}_{T}g^{n}\,{}^{wg-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}} = {}^{z+\zeta}\underline{g}^{\delta n}\,{}^{(z+\zeta)g-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft} = {}^{\zeta}\overbrace{{}^{z}_{U}g \ltimes {}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}$$

$$\Rightarrow {}^{z}\mathfrak{t} \ltimes \underbrace{{}^{w}_{T}g^{n}\,{}^{wg-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}} = {}^{z}_{U}g \underset{n}{\rtimes} {}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft$$

$$^{z}\overbrace{p_{\partial}\underbrace{{}^{w}_{T}g^{n}\,{}^{wg}\blacktriangleleft}} = \sum_{\mu} {}^{z}\overbrace{p_{\partial}\underbrace{{}^{w}_{T}g^{n}\,{}^{wg-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}}} = \sum_{\mu} {}^{0}\overbrace{{}^{z}\mathfrak{t}\ltimes p_{\partial}\underbrace{{}^{w}_{T}g^{n}\,{}^{wg-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}}}$$

$$= \sum_{\mu} {}^{0}\overbrace{p_{\partial}\big|{}^{z}\mathfrak{t}\ltimes \underbrace{{}^{w}_{T}g^{n}\,{}^{wg-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}}} = \sum_{\mu} p\bar{\bowtie}\overbrace{{}^{z}\mathfrak{t}\ltimes \underbrace{{}^{w}_{T}g^{n}\,{}^{wg-zg}\overbrace{{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}}} = \sum_{\mu} p\bar{\bowtie}\overbrace{{}^{z}_{U}g\underset{n}{\rtimes}{}^{zg}\mathcal{E}^{\mu}_{\partial}\blacktriangleleft}$$

$$^{|z}\overbrace{\mathcal{E}^{\mu}_{\partial}\P} = {}^{z}\mathcal{E}^{\mu}_{\partial}\,{}^{|z}\P$$

$$
{}^{z}\overbrace{p_{\partial}\underbrace{{}^{w}\underline{g}^{\nu^{wg|zg}}\P}} = \sum_{\mu} p\,\bar{\ast}\,{}^{z}\overbrace{g \ltimes \mathcal{E}^{\mu}_{\partial}\P}
$$

$$
\bigwedge_{z}^{D} {}^{z}\overbrace{g \ltimes \mathcal{E}^{\mu}_{\partial}\P} = {}^{z}_{U}g \ltimes_{\nu} {}^{zg}\overbrace{\mathcal{E}^{\mu}_{\partial}\P} = {}^{z}_{U}g \ltimes_{\nu} {}^{zg}\mathcal{E}^{\mu\ |zg}_{\partial}\P \in {}^{Z}\triangleright \check{\mathbb{C}}^{\nu}
$$

$$
\Rightarrow \sum_{\mu} p\,\bar{\ast}\,{}^{z}\overbrace{g \ltimes \mathcal{E}^{\mu}_{\partial}\P} = \sum_{\mu} p\,\bar{\ast}\,\underbrace{{}^{z}_{U}g \ltimes_{\nu} {}^{zg}\mathcal{E}^{\mu|zg}_{\partial}\P} = {}^{z}\overbrace{p_{\partial}\underbrace{{}^{w}\underline{g}^{\nu^{wg|zg}}\P}}
$$

$$
{}^{z}\widetilde{F} = {}^{c+z\overset{*}{\mathrm{l}}}F \Rightarrow {}^{z}\overbrace{\partial_{p}\widetilde{F}} = {}^{c+z\overset{*}{\mathrm{l}}}\overbrace{\partial_{\mathrm{l}\ltimes p}F}
$$

$$
{}^{z}\overbrace{\partial_{\bar{\ast}\mathrm{L}}\widetilde{F}} = \mathrm{L}\,{}^{z}\underline{\widetilde{F}} = \underbrace{\mathrm{L}\overset{*}{\mathrm{l}}}\,{}^{c+z\overset{*}{\mathrm{l}}}\underline{F} = {}^{c+z\overset{*}{\mathrm{l}}}\overbrace{\partial_{\bar{\ast}\underbrace{\mathrm{L}\overset{*}{\mathrm{l}}}}\widetilde{F}} = {}^{c+z\overset{*}{\mathrm{l}}}\overbrace{\partial_{\mathrm{l}\ltimes\bar{\ast}\mathrm{L}}\widetilde{F}}
$$

$$
{}^{z}\overbrace{\partial_{\bar{\ast}\overset{k}{\bowtie}\mathrm{L}}\widetilde{F}} = \underbrace{\overset{k}{\bowtie}\mathrm{L}}\,{}^{z}\underline{\underline{\widetilde{F}}} = \underbrace{\overset{k}{\bowtie}\overbrace{\mathrm{L}\overset{*}{\mathrm{l}}}}\,{}^{c+z\overset{*}{\mathrm{l}}}\underline{\underline{F}} = {}^{c+z\overset{*}{\mathrm{l}}}\overbrace{\partial_{\bar{\ast}\overset{k}{\bowtie}\underbrace{\mathrm{L}\overset{*}{\mathrm{l}}}}\widetilde{F}} = {}^{c+z\overset{*}{\mathrm{l}}}\overbrace{\partial_{\mathrm{l}\ltimes\bar{\ast}\overset{k}{\bowtie}\mathrm{L}}\widetilde{F}}
$$

$$
\dot{\mathrm{L}}^{1}\cdots\dot{\mathrm{L}}^{n}\ {}_{n}\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}} = \sum_{I_1\cup\cdots\cup I_k = N}^{\text{partition } \mathcal{I}} \overbrace{\dot{z}^{I_1}\,{}^{z}_{|I_1|}\underline{\varphi}\cdots\dot{z}^{I_k}\,{}^{z}_{|I_k|}\underline{\varphi}}\ {}_{|\mathcal{I}|}\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}} = \sum_{\mathcal{I}}^{\text{partition}} \underbrace{\prod_{I}^{\mathcal{I}}\overbrace{\dot{z}^{I}\,{}^{z}_{|I|}\underline{\varphi}}}\ {}_{|\mathcal{I}|}\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}}
$$

$$
\dot{z}\ \underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}} = \overbrace{\dot{z}\,{}^{z}\underline{\varphi}}\,\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}}
$$

$$
\dot{\mathrm{L}}^{1}\dot{\mathrm{L}}^{2}\ {}_{2}\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}} = \overbrace{\dot{\mathrm{L}}^{1}\dot{\mathrm{L}}^{2}\,{}^{z}_{2}\underline{\varphi}}\,\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}} + \overbrace{\dot{\mathrm{L}}^{1}\,{}^{z}\underline{\varphi}}\,\overbrace{\dot{\mathrm{L}}^{2}\,{}^{z}\underline{\varphi}}\ {}_{2}\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}}
$$

$$
\dot{\mathrm{L}}^{1}\dot{\mathrm{L}}^{2}\dot{\mathrm{L}}^{3}\ {}_{3}\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}} = \overbrace{\dot{\mathrm{L}}^{1}\dot{\mathrm{L}}^{2}\dot{\mathrm{L}}^{3}\,{}^{z}_{3}\underline{\varphi}}\,\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}} + \overbrace{\dot{\mathrm{L}}^{i}\dot{\mathrm{L}}^{j}\,{}^{z}_{2}\underline{\varphi}}\,\overbrace{\dot{\mathrm{L}}^{k}\,{}^{z}\underline{\varphi}}\ {}_{2}\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}} + \overbrace{\dot{\mathrm{L}}^{1}\,{}^{z}\underline{\varphi}}\,\overbrace{\dot{\mathrm{L}}^{2}\,{}^{z}\underline{\varphi}}\,\overbrace{\dot{\mathrm{L}}^{3}\,{}^{z}\underline{\varphi}}\ {}_{3}\underline{{}^{z\varphi}\mathcal{E}^{\mu}_{\omega}}
$$

$$
{}^{z}\overbrace{\partial_{p}\mathsf{4}} = \bar{\ast}p\,{}^{z}_{k}\underline{\underline{\mathsf{4}}}
$$

$$
{}^{z}\overbrace{\partial_{\bar{\ast}\dot{z}}\mathsf{4}} = \dot{z}\ {}^{z}\underline{\mathsf{4}}
$$

$$
{}^{z}\overbrace{\partial_{\bar{\ast}\dot{z}}\mathsf{4}} = \dot{z}^{k}\ {}^{z}_{k}\underline{\underline{\mathsf{4}}}
$$