

$$\varkappa_1 \geq \cdots \varkappa_p \geq (-q)^{n-p-q} \geq \varkappa_{n+1-q} \geq \cdots \geq \varkappa_n$$

$$\bigwedge_{1 \leq i \leq n-p-q} \varkappa_{p+i} = -q$$

$$\begin{aligned} e^{-z} \Delta^{\varepsilon s - p - q} e^{-z} \bar{\Delta}^{\varepsilon t} &= 2^{-\varepsilon t n} \prod_j \frac{\Gamma_{\varepsilon(s+t) - p - q + j}}{\Gamma_{\varepsilon s - p - q + j}} \sum_{\varkappa} \prod_j \frac{\Gamma_{\varkappa_j + p + q - j + 1 - \varepsilon s}}{\Gamma_{\varkappa_j + n - j + 1 + \varepsilon t}} d_{\varkappa} z X_{\varkappa}^{\mathbb{C}} \\ &= 2^{-\varepsilon t n} \prod_j \frac{\Gamma_{\varepsilon(s+t) - p - q + j}}{\Gamma_{\varepsilon s - p - q + j}} \sum_{\varkappa} d_{\varkappa} z X_{\varkappa}^{\mathbb{C}} \end{aligned}$$

$$\prod_{1 \leq j \leq p} \frac{\Gamma_{\substack{\geq p-j+1 \geq 1 \\ \varkappa_j + p + q - j + 1 - \varepsilon s}}}{\Gamma_{\substack{\varkappa_j + n - j + 1 \\ \geq n - q - j + 1 \geq p - j + 1 \geq 1}} + \varepsilon t} \prod_{p < j \leq n - q} \frac{\Gamma_{\substack{p-j+1 \leq 0 \\ \varkappa_j + p + q - j + 1 - \varepsilon s}}}{\Gamma_{\substack{\varkappa_j + n - j + 1 + \varepsilon t \\ n - q - j + 1 \geq 1}}} \prod_{n - q < j \leq n} \frac{\Gamma_{\substack{\leq p-j+1 \leq n-q-j+1 \leq 0 \\ \varkappa_j + p + q - j + 1 - \varepsilon s}}}{\Gamma_{\substack{\varkappa_j + n - j + 1 + \varepsilon t \\ \leq n - q - j + 1 \leq 0}}}$$

$$= 2^{-\varepsilon t n} \prod_j \frac{\varepsilon s}{\varepsilon(s+t)} \sum_{\varkappa} d_{\varkappa} z X_{\varkappa}^{\mathbb{C}}$$

$$\prod_{1 \leq j \leq p} \frac{\Gamma_{\varkappa_j + p + q - j + 1}}{\Gamma_{\varkappa_j + n - j + 1}} \prod_{p < j \leq n - q} \frac{1}{\Gamma_{j-p}(-\varepsilon s) \Gamma_{n-q-j+1}} \prod_{n-q < j \leq n} \frac{\Gamma_{-\varkappa_j - n + j}(\varepsilon t)}{\Gamma_{-\varkappa_j - p - q + j}(-\varepsilon s)}$$

$$= \varepsilon^{p+q-n} \frac{s^{n-p} t^{q^n}}{s+t} \sum_{\varkappa} d_{\varkappa} z X_{\varkappa}^{\mathbb{C}} \prod_{1 \leq j \leq p} \frac{\Gamma_{\varkappa_j + p + q - j + 1}}{\Gamma_{\varkappa_j + n - j + 1}} \prod_{p < j \leq n - q} \frac{1}{\Gamma_{j-p} \Gamma_{n-q-j+1}} \prod_{n-q < j \leq n} \frac{\Gamma_{-\varkappa_j - n + j}}{\Gamma_{-\varkappa_j - p - q + j}}$$