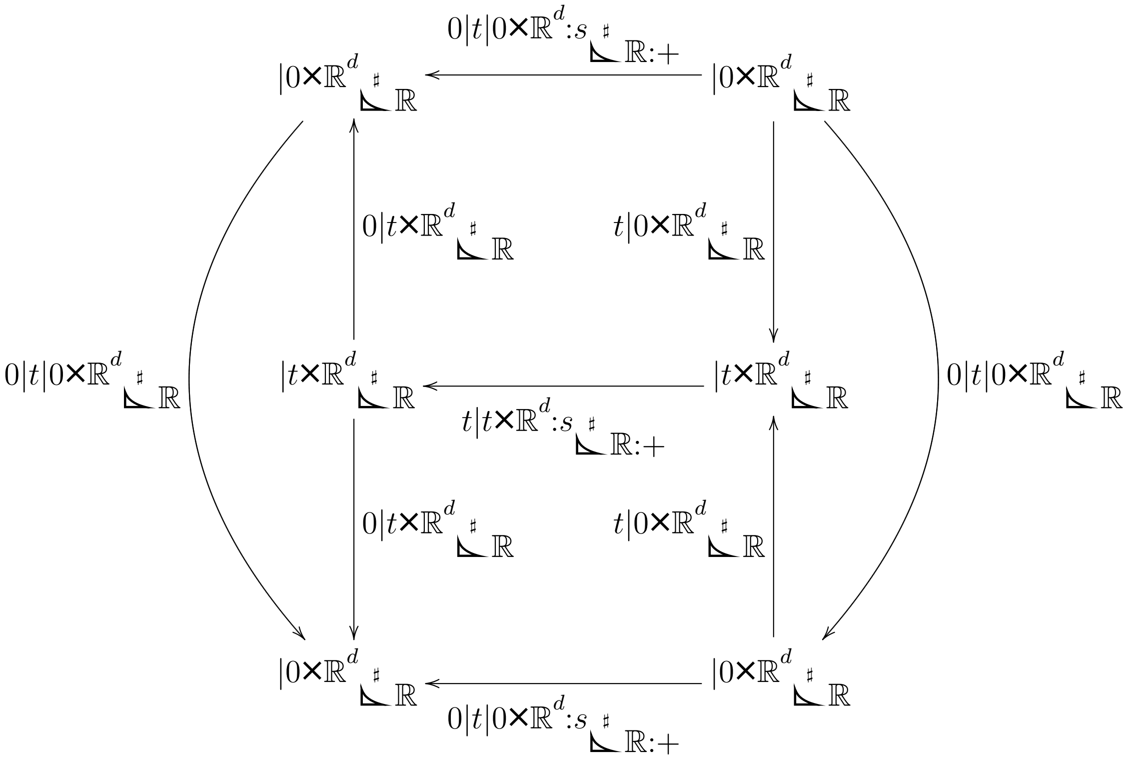

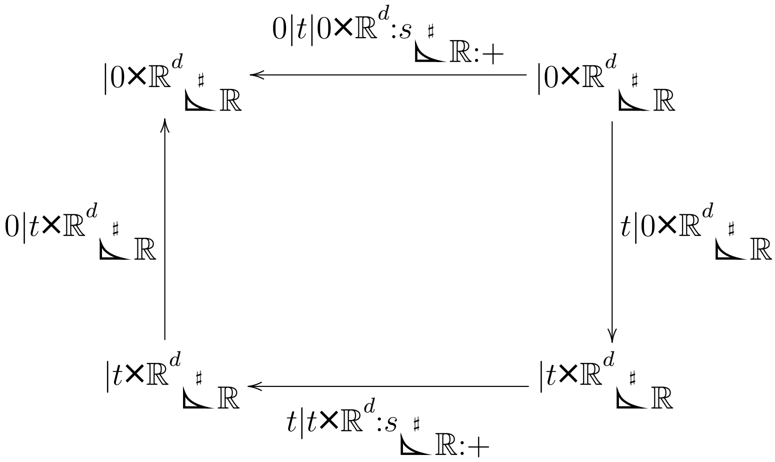

$$\overrightarrow{\prod_j {}^{0|x_j^0|0\times\mathbb{R}^d:x_j^>}\llcorner^{\sharp}\mathbb{R}{:}+} = \sum_{\pi\,\in\,\mathcal{S}_n} \Theta\left(x^0_{\pi_1}-x^0_{\pi_2}\right)\cdots\Theta\left(x^0_{\pi_{n\text{-}1}}-x^0_{\pi_n}\right)\prod_j {}^{0|x^0_{\pi_j}|0\times\mathbb{R}^d:x^>_{\pi_j}}\llcorner^{\sharp}\mathbb{R}{:}+$$

$$0|t|0\times\mathbb{R}^{d}:\daleth^{\sharp}_{\llcorner}\mathbb{R}:+ \;=\; \int_{dx}^{\mathbb{R}^{d}} {}^{x}\daleth\; 0|t|0\times\mathbb{R}^{d}:x^{\sharp}_{\llcorner}\mathbb{R}:+ \;=\; \blacktriangledown\,\bar{\daleth}^{\sharp}\; e^{it\overline{()}}/\overline{()} + \blacktriangle\,\daleth^{\sharp}\; e^{it\overline{()}}/\overline{()}$$

$$\text{LHS} \;=\; \int_{dx}^{\mathbb{R}^{d}} {}^{x}\daleth\; \overbrace{e^{i\underbrace{x\xi - t\overline{\xi}}}\blacktriangledown_{\xi} + e^{i\underbrace{t\overline{\xi} - x\xi}}\blacktriangle_{\xi}} \int_{d\mathbb{R}}^{d\xi/\overline{\xi}}$$

$$= \underbrace{\overline{\int_{dx}^{\mathbb{R}^{d}} {}^{x}\bar{\daleth}}e^{-ix\xi}e^{-it\overline{\xi}}\blacktriangledown_{\xi} + \int_{dx}^{\mathbb{R}^{d}} {}^{x}\daleth e^{-ix\xi}e^{it\overline{\xi}}\blacktriangle_{\xi}} \int_{d\mathbb{R}}^{d\xi/\overline{\xi}} \;=\; \underbrace{\overline{\bar{\daleth}^{\sharp}_{\xi}e^{it\overline{\xi}}}\blacktriangledown_{\xi} + \daleth^{\sharp}_{\xi}e^{it\overline{\xi}}\blacktriangle_{\xi}} \int_{d\mathbb{R}}^{d\xi/\overline{\xi}} \;=\; \text{RHS}$$

$$0|t|0\times\mathbb{R}^{d}:\daleth^{\sharp}_{\llcorner}\mathbb{R}:- \;=\; \int_{dx}^{\mathbb{R}^{d}} {}^{x}\daleth\; 0|t|0\times\mathbb{R}^{d}:x^{\sharp}_{\llcorner}\mathbb{R}:- \;=\; \blacktriangledown\,\bar{\daleth}^{\sharp}\; e^{it\overline{()}} - \blacktriangle\,\daleth^{\sharp}\; e^{it\overline{()}}$$

$$\text{LHS} \;=\; \int_{dx}^{\mathbb{R}^{d}} {}^{x}\daleth\; \overbrace{e^{i\underbrace{x\xi - t\overline{\xi}}}\blacktriangledown_{\xi} - e^{i\underbrace{t\overline{\xi} - x\xi}}\blacktriangle_{\xi}} \int_{d\mathbb{R}}^{d\xi}$$

$$= \underbrace{\overline{\int_{dx}^{\mathbb{R}^{d}} {}^{x}\bar{\daleth}}e^{-ix\xi}e^{-it\overline{\xi}}\blacktriangledown_{\xi} - \int_{dx}^{\mathbb{R}^{d}} {}^{x}\daleth e^{-ix\xi}e^{it\overline{\xi}}\blacktriangle_{\xi}} \int_{d\mathbb{R}}^{d\xi} \;=\; \underbrace{\overline{\bar{\daleth}^{\sharp}_{\xi}e^{it\overline{\xi}}}\blacktriangledown_{\xi} - \daleth^{\sharp}_{\xi}e^{it\overline{\xi}}\blacktriangle_{\xi}} \int_{d\mathbb{R}}^{d\xi} \;=\; \text{RHS}$$

$$|\mathbb{R}|\times\mathbb{R}^{d}:x_{1}\cdots x_{2n}{}^{\sharp}_{\llcorner}\mathbb{R}:+ \;=\; \Omega\blacktriangledown\underbrace{|\mathbb{R}|\times\mathbb{R}^{d}:x_{1}\cdots x_{2n}{}^{\sharp}_{\llcorner}\mathbb{R}:+}\Omega \;=\; \int^{d\mu_{C}(\mathbb{F})} \mathbb{F}_{x_{1}}\cdots\mathbb{F}_{x_{2n}}$$

$$= \sum_{\alpha:\beta}^{(2n-1)!!} {}^{\alpha_{1}x}C_{\beta_{1}x}\cdots{}^{\alpha_{n}x}C_{\beta_{n}x}$$

$$|\mathbb{R}|\times\mathbb{R}^{d}:x:y^{\sharp}_{\llcorner}\mathbb{R}:+ \;=\; \overbrace{\Delta - m^{2}}^{-1}\,\delta\left(x-y\right)$$

$$|\mathbb{R}|\times\mathbb{R}^{d}:f_{1}\cdots f_{2n}\llcorner^{\sharp}\mathbb{R}:+ = \int_{d_{1}x}^{\mathbb{R}^{1:d}} {}_{1}x f_{1}\cdots\int_{d_{2n}x}^{\mathbb{R}^{1:d}} {}_{2n}x f_{2n}\,|\mathbb{R}|\times\mathbb{R}^{d}:x_{1}\cdots x_{2n}\llcorner^{\sharp}\mathbb{R}:+$$

$$= \int_{d_{1}x}^{\mathbb{R}^{1:d}} {}_{1}x f_{1}\cdots\int_{d_{2n}x}^{\mathbb{R}^{1:d}} {}_{2n}x f_{2n}\int^{d\mu_{C}(\mathbb{F})}\mathbb{F}_{x_{1}}\cdots\mathbb{F}_{x_{2n}} = \int^{d\mu_{C}(\mathbb{F})}\int_{d_{1}x}^{\mathbb{R}^{1:d}}\mathbb{F}_{x_{1}}\,{}_{1}x f_{1}\cdots\int_{d_{2n}x}^{\mathbb{R}^{1:d}}\mathbb{F}_{x_{2n}}\,{}_{2n}x f_{2n} = \int^{d\mu_{C}(\mathbb{F})}\mathbb{F}|f_{1}\cdots\mathbb{F}|f_{2n}$$

$$= \sum_{\alpha:\beta}^{(2n-1)!!} f_{\alpha_{1}}\bowtie\underbrace{Cf_{\beta_{1}}}\cdots f_{\alpha_{n}}\bowtie\underbrace{Cf_{\beta_{n}}}$$