$$\ell = 1$$

$$\int f = \int_{du}^{S_1} \int_{d_u^0\,(x)}^{\Omega_u} {}^x\mathcal{L}_u \, {}^x f = \int_{dt/t}^{0|\infty} {}^t\mathcal{L} \int_{du}^{S_1} {}^{tu} f$$

$$p_n \underset{S_1}{\bowtie} q_n = \frac{(a/2)_n}{(d/r)_n (ra/2)_n} p_n \underset{Z}{\bowtie} q_n$$

$$\overbrace{\mathcal{E}_a^m \underbrace{u|w}} \underset{S_1}{\bowtie} \mathcal{E}_b^{m+} = \frac{(a/2)_{m+}}{(d/r)_{m+} (ra/2)_{m+}} {}^a\mathcal{E}_b^m \underbrace{w|b}$$

$$\text{LHS} = \frac{(a/2)_{m+}}{(d/r)_{m+} (ra/2)_{m+}} \overbrace{\mathcal{E}_a^m \underbrace{z|w}} \underset{Z}{\bowtie} \mathcal{E}_b^{m+} = \text{RHS}$$

$$\phi_m \bowtie \left(\alpha \underbrace{w|u} + \beta \frac{{}^x\underline{\mathcal{L}}_u}{{}^x\mathcal{L}_u} x\overset{\ast}{u} w_1\right) \psi_{m+} = \overbrace{\phi_m \underbrace{u|w}} \underset{S_1}{\bowtie} \psi_{m+} \int_{dt}^{0|\infty} t^{2m} \left(\alpha\, {}^t\mathcal{L} + t\beta\, {}^t\underline{\mathcal{L}}\right)$$

$$u \in S_1 \Rightarrow \underbrace{tu}\,\overset{\ast}{u}\, w_1 = t \cdot u \overset{\ast}{u}\, w_1 = tu \underbrace{w|u} \Rightarrow {}^{tu}\underline{\mathcal{L}}_u \underbrace{tu}\,\overset{\ast}{u}\, w_1 = t \cdot {}^t\underline{\mathcal{L}} \underbrace{w|u}$$

$$\text{LHS} = \int_{du}^{S_1} \int_{d_u^0\,(x)}^{\Omega_u} {}^x\bar{\phi}_m \, {}^x\psi_{m+} \left(\alpha \underbrace{w|u} + \beta \frac{{}^x\underline{\mathcal{L}}_u}{{}^x\mathcal{L}_u} x\overset{\ast}{u} w_1\right) {}^x\mathcal{L}_u = \int_{du}^{S_1} \int_{d_u^0\,(x)}^{\Omega_u} {}^x\bar{\phi}_m \, {}^x\psi_{m+} \left(\alpha \underbrace{w|u}\, {}^x\mathcal{L}_u + \beta\, {}^x\underline{\mathcal{L}}_u \underbrace{x\overset{\ast}{u}w_1}\right)$$

$$= \int_{dt/t}^{0|\infty} \int_{du}^{S_1} {}^{tu}\bar{\phi}_m \, {}^{tu}\psi_{m+} \left(\alpha \underbrace{w|u}\, {}^{tu}\mathcal{L}_u + \beta\, {}^{tu}\underline{\mathcal{L}}_u \underbrace{tu\overset{\ast}{u}w_1}\right) = \int_{dt}^{0|\infty} t^{2m} \left(\alpha\, {}^t\mathcal{L} + t\beta\, {}^t\underline{\mathcal{L}}\right) \int_{du}^{S_1} {}^u\bar{\phi}_m \, {}^u\psi_{m+} \underbrace{w|u} = \text{RHS}$$

$$\mathcal{E}_a^m \bowtie \left(\alpha \underbrace{w|u} + \beta \frac{{}^x\underline{\mathcal{L}}_u}{{}^x\mathcal{L}_u} x\overset{\ast}{u} w_1\right) \mathcal{E}_b^{m+} = \frac{(a/2)_{m+}}{(d/r)_{m+} (ra/2)_{m+}} {}^a\mathcal{E}_b^m \underbrace{w|b} \int_{dt}^{0|\infty} t^{2m} \left(\alpha\, {}^t\mathcal{L} + t\beta\, {}^t\underline{\mathcal{L}}\right)$$