$$\underline{G}_\lambda \xleftarrow[\text{unit irred}]{\ltimes} G \ltimes \underline{G}_\lambda$$

$$\int_{dg}^{G} \overbrace{\underbrace{g \ltimes \mathfrak{q}}\underset{\lambda}{\curlywedge}\acute{\mathfrak{q}}}\;\overbrace{\acute{\mathfrak{q}}'\underset{\lambda}{\curlywedge}\underbrace{g \ltimes \mathfrak{q}'}} \underset{\text{Schur}}{=} \frac{1}{\dim \underline{G}_\lambda} \mathfrak{q} \underset{\lambda}{\curlywedge} \mathfrak{q}' \acute{\mathfrak{q}} \underset{\lambda}{\curlywedge} \acute{\mathfrak{q}}'$$

$$\underline{G}_\lambda \xleftarrow[K \text{ equiv}]{j} \underline{K}_\mu$$

$${}^{G}\underset{\infty}{\triangle}\overset{\mu}{\mathsf{J}} = \frac{\mathfrak{q} \in {}^{G}\underset{\infty}{\triangle}\mathsf{J}}{{}^{ky}\mathfrak{q} = k^{\mu y}\mathfrak{q}} : \quad \mu \text{ hom}$$

$$\tilde{\mathfrak{q}} \in {}^{G}\underset{\infty}{\triangle}\overset{\mu}{\mathsf{J}} \xleftarrow[G \text{ equiv}]{} \underline{G}_\lambda \ni \mathfrak{q}$$

$${}^{y}\tilde{\mathfrak{q}} = \overset{*}{j}\, \underbrace{y \ltimes \mathfrak{q}}$$

$${}^{ky}\tilde{\mathfrak{q}} = k\, {}^{y}\tilde{\mathfrak{q}}$$

$$g \,\tilde{\ltimes}\, \mathfrak{q} = g \ltimes \tilde{\mathfrak{q}}$$

$${}^{y}\widetilde{\mathcal{K}}_g^{-1} = \overset{*}{j}\, y \,\overset{-1}{g}\, j \in \mathbb{C}|\mathsf{J}$$

$${}^{ky}\widetilde{\mathcal{K}}_{kg}^{-1} = k\, {}^{y}\widetilde{\mathcal{K}}_g^{-1}\, k^{-1}$$

$$\mathcal{K}_g^{-1} \rfloor = g^{-1} \ltimes \underbrace{j\rfloor} \in \underline{G}_\lambda$$

$$\rfloor \underset{\mathsf{J}}{\curlywedge} {}^{g}\tilde{\mathfrak{q}} = \rfloor \underset{\mathsf{J}}{\curlywedge} \overset{*}{j}\, \underbrace{g \ltimes \mathfrak{q}} = \underbrace{j\rfloor} \underset{\lambda}{\curlywedge} \underbrace{g \ltimes \mathfrak{q}} = \underbrace{g^{-1} \ltimes j\rfloor} \underset{\lambda}{\curlywedge} \mathfrak{q} = \underbrace{\mathcal{K}_g^{-1}\rfloor} \underset{\lambda}{\curlywedge} \mathfrak{q}$$

$${}^{y}\widetilde{\mathcal{K}_g^{-1}} \rfloor = \overset{*}{j}\, \underbrace{y \ltimes \overbrace{\mathcal{K}_g^{-1}\rfloor}} = \overset{*}{j}\, \underbrace{y \ltimes \overbrace{g^{-1} \ltimes \underbrace{j\rfloor}}} = \underbrace{\overset{*}{j} y g^{-1} j}\rfloor = {}^{y}\widetilde{\mathcal{K}}_g^{-1} \rfloor$$

$$\tilde{\mathsf{q}} \bowtie \tilde{\mathsf{f}} = \frac{\dim \urcorner}{\dim \underset{-}{G}_\lambda} \mathsf{q} \bowtie \mathsf{f}$$

$$\text{LHS} = \int\limits_{dg}^{G} {}^{g}\tilde{\mathsf{q}} \underset{\lrcorner}{\bowtie} {}^{g}\tilde{\mathsf{f}} = \int\limits_{dg}^{G} \overset{*}{j} \underbrace{g \ltimes \mathsf{q}} \underset{\lrcorner}{\bowtie} \overset{*}{j} \underbrace{g \ltimes \mathsf{f}} = \int\limits_{dg}^{G} \overbrace{\overset{*}{j} \underbrace{g \ltimes \mathsf{q}} \underset{\lrcorner}{\bowtie} \ulcorner_i} \overbrace{\ulcorner_i \underset{\lrcorner}{\bowtie} \overset{*}{j} \underbrace{g \ltimes \mathsf{f}}} = \int\limits_{dg}^{G} \overbrace{\underbrace{g \ltimes \mathsf{q}} \underset{\lambda}{\bowtie} j \ulcorner_i} \overbrace{j \ulcorner_i \underset{\lambda}{\bowtie} \underbrace{g \ltimes \mathsf{f}}}$$

$$\underset{\text{Schur}}{=} \frac{1}{\dim \underset{-}{G}_\lambda} \mathsf{q} \underset{\lambda}{\bowtie} \mathsf{f} \underbrace{j \ulcorner_i} \underset{\lambda}{\bowtie} \underbrace{j \ulcorner_i} = \frac{1}{\dim \underset{-}{G}_\lambda} \mathsf{q} \underset{\lambda}{\bowtie} \mathsf{f} \overbrace{\ulcorner_i \underset{\urcorner}{\bowtie} \ulcorner_i}^{=1} = \text{RHS}$$