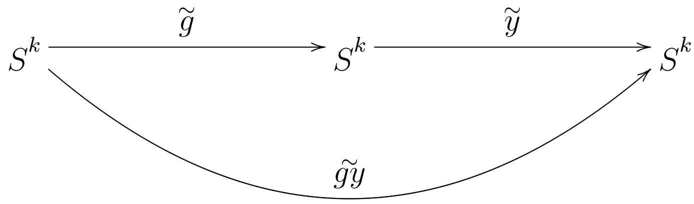

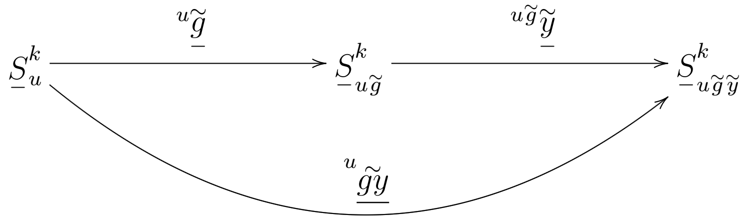

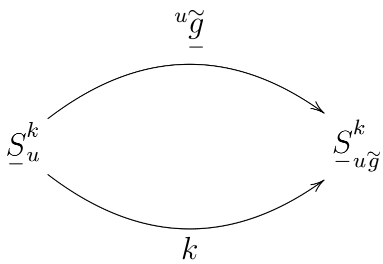

$$ {}^{u}\widetilde{\widetilde{g}} = \lceil\lfloor {}^{u}\underline{\widetilde{g}}k^{-1} \rfloor\rceil : \quad {}^{u}\widetilde{g} = uk \text{ well-def} $$

$$ {}^{u}\widetilde{g} = uh = uk \Rightarrow uh\,k^{-1} = u \Rightarrow {}^{u}\underline{\widetilde{g}}\,k^{-1} = {}^{u}\underline{\widetilde{g}}\,h^{-1}h\,k^{-1} \Rightarrow \lfloor {}^{u}\underline{\widetilde{g}}k^{-1} \rfloor = \lfloor {}^{u}\underline{\widetilde{g}}h^{-1} \rfloor \lfloor hk^{-1} \rfloor $$

$$ \Rightarrow \lceil\lfloor {}^{u}\underline{\widetilde{g}}k^{-1} \rfloor\rceil = \lceil\lfloor {}^{u}\underline{\widetilde{g}}h^{-1} \rfloor\rceil \overset{=1}{\lceil\lfloor hk^{-1} \rfloor\rceil} = \lceil\lfloor {}^{u}\underline{\widetilde{g}}h^{-1} \rfloor\rceil $$

$$ {}^{u}\widetilde{\widetilde{g}}\; {}^{u\widetilde{g}}\widetilde{\widetilde{y}} = {}^{u}\widetilde{\widetilde{gy}} \ \text{ co-cycle} $$

$$ \begin{cases} {}^{u}\widetilde{g} = uk \\ {}^{u\widetilde{g}}\widetilde{y} = {}^{u}\widetilde{g}h \end{cases} \Longrightarrow {}^{u}\widetilde{gy} = {}^{u\widetilde{g}}\widetilde{y} = {}^{u}\widetilde{g}\,h = ukh $$

$$ \Longrightarrow {}^{u}\underline{\widetilde{gy}}\;\overbrace{kh}^{-1} = {}^{u}\underline{\widetilde{g}}\;{}^{u\widetilde{g}}\underline{\widetilde{y}}\;h^{-1}\,k^{-1} = {}^{u}\underline{\widetilde{g}}\;k^{-1}\,k\,{}^{u\widetilde{g}}\underline{\widetilde{y}}\;h^{-1}\,k^{-1} $$

$$ \Longrightarrow \underbrace{{}^{u}\underline{\widetilde{gy}}\,\overbrace{kh}^{-1}}_{u} = \underbrace{{}^{u}\underline{\widetilde{g}}k^{-1}}_{u}\;\underbrace{k\,{}^{u\widetilde{g}}\underline{\widetilde{y}}h^{-1}k^{-1}}_{u} = \underbrace{{}^{u}\underline{\widetilde{g}}k^{-1}}_{u}\;\underbrace{{}^{u\widetilde{g}}\underline{\widetilde{y}}h^{-1}}_{u\widetilde{g}} $$

$$ \underset{>}{\mathbb{R}}\times S^{k} \xrightarrow{\ \hat{g}\ } \underset{>}{\mathbb{R}}\times S^{k} \xrightarrow{\ \hat{y}\ } \underset{>}{\mathbb{R}}\times S^{k} $$

$$ \underset{>}{\mathbb{R}}\times S^{k} \xrightarrow{\ \widehat{gy}\ } \underset{>}{\mathbb{R}}\times S^{k} $$

$$ \underbrace{\lambda{:}u} \rtimes g = \underbrace{\lambda^{u}\widetilde{\widetilde{g}}}:{}^{u}\widetilde{g} $$

$$ \overbrace{\underbrace{\lambda{:}u} \rtimes g} \rtimes y = \overbrace{\underbrace{\lambda^{u}\widetilde{\widetilde{g}}}:{}^{u}\widetilde{g}} \rtimes y = \overbrace{\underbrace{\lambda^{u}\widetilde{\widetilde{g}}}\,{}^{u\widetilde{g}}\widetilde{\widetilde{y}}}:\underbrace{{}^{u\widetilde{g}}\widetilde{y}} = \underbrace{{}^{u}\widetilde{\widetilde{gy}}}:{}^{u}\widetilde{gy} = \underbrace{\lambda{:}u} \rtimes \underbrace{gy} $$