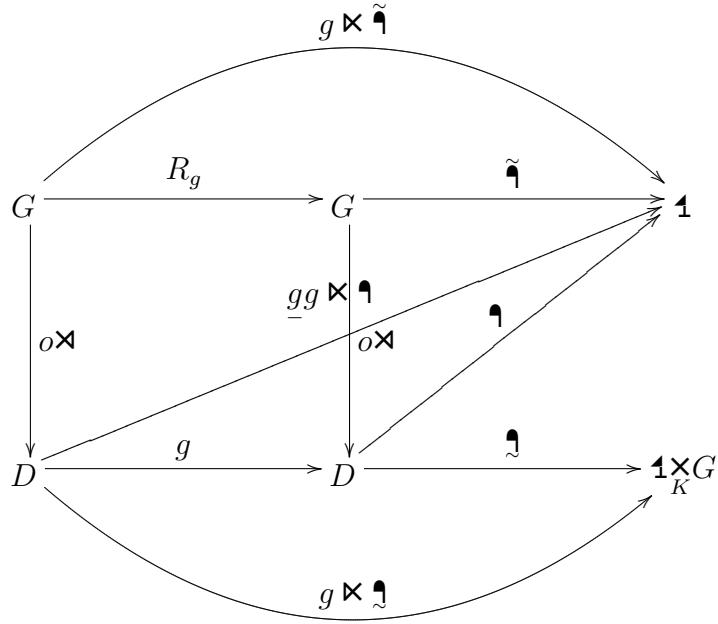


$$\begin{aligned}
{}^x \mathfrak{J} &= \gamma_x : {}^{\gamma_x} \tilde{\mathfrak{I}} \\
\begin{cases} {}^{\gamma_x} \tilde{\mathfrak{I}} = {}^o \gamma_x {}^x \mathfrak{I} \\ {}^g \tilde{\mathfrak{I}} = {}^o g {}^{\underline{o}g} \mathfrak{I} \end{cases} \\
\text{cocycle } x:g \in D \times G \rightarrow K^{\mathbb{C}} &\ni {}^x g
\end{aligned}$$

$$\begin{array}{ccc}
G & \xrightarrow{\quad \tilde{\mathfrak{I}} \quad} & \mathbf{1} \\
\downarrow o \rtimes & \nearrow & \\
D & \xrightarrow{\quad \tilde{\mathfrak{I}} \quad} & \mathbf{1}_K \times G
\end{array}$$

$$\begin{aligned}
\mathbf{1} &\ni \begin{cases} {}^{\gamma_x} \tilde{\mathfrak{I}} = {}^x B_x {}^x \mathfrak{I} \\ {}^g \tilde{\mathfrak{I}} = {}^o g {}^{\underline{o}g} \mathfrak{I} \end{cases} \Rightarrow {}^k g \tilde{\mathfrak{I}} = {}^o k g {}^o k g \mathfrak{I} = {}^o k {}^o k g {}^o g \mathfrak{I} = {}^o k {}^o g {}^o g \mathfrak{I} = {}^o k {}^g \tilde{\mathfrak{I}} \\
\mathbf{1} \times (og) &\ni \begin{cases} {}^{og} \tilde{\mathfrak{I}} = {}^g \tilde{\mathfrak{I}} : g = {}^o g {}^{\underline{o}g} \mathfrak{I} : g \\ {}^x \tilde{\mathfrak{I}} = {}^{\gamma_x} \tilde{\mathfrak{I}} : \gamma_x = {}^x B_x {}^x \mathfrak{I} : \gamma_x \end{cases}
\end{aligned}$$



$$\begin{aligned} \widehat{g \bowtie \tilde{\mathbf{q}}} &= \widehat{R_g \tilde{\mathbf{q}}} = \widehat{y g \tilde{\mathbf{q}}} \Rightarrow \widehat{g \bowtie \tilde{\mathbf{q}}} = \widehat{k y \cdot g \tilde{\mathbf{q}}} = \widehat{k \cdot y g \tilde{\mathbf{q}}} = \widehat{o k y g \tilde{\mathbf{q}}} = \widehat{o k g \bowtie \tilde{\mathbf{q}}} \\ \widehat{\underline{g} g \bowtie \mathbf{q}} &= \widehat{o y \underline{g} g \bowtie \mathbf{q}} = \widehat{o y \underline{o y g} \underline{g \cdot g \tilde{\mathbf{q}}}} = \widehat{o y g} \widehat{o y g \tilde{\mathbf{q}}} = \widehat{y g \tilde{\mathbf{q}}} = \widehat{R_g \tilde{\mathbf{q}}} \end{aligned}$$

$$\widehat{k \bowtie \mathbf{q}} = \widehat{k^e R_g \bowtie \mathbf{q}}$$

$$\text{LHS} = {}^0 \partial_t {}^{t \mathbf{e}^k} g \mathbf{q} = {}^0 \partial_t {}^{t \mathbf{e}^k} \widehat{R_g \bowtie \mathbf{q}} = \text{RHS}$$

$$\mathbf{b} \in \underline{G} \Rightarrow \mathbf{b}_g = \mathbf{b} R_g \in \underline{G}_g$$

$$x : \mathbf{b} \in D \bowtie \underline{G} \xrightarrow{\bowtie} \underline{D} \ni \mathbf{b}_x$$

$$\mathbf{b}_{og} = \mathbf{b}_g o^g \underline{\bowtie}$$

$$\frac{g}{\nabla_{\mathfrak{b}_{og}}} \mathfrak{P} = \overline{\mathfrak{b}}^e \underline{R_g} \ltimes \widetilde{\mathfrak{P}}$$

$$\text{LHS} = \overbrace{\nabla_{\mathfrak{b}_o^g \underline{\mathfrak{x}}} \mathfrak{q}}^g = \mathfrak{b} \underline{R_g} \overbrace{\mathfrak{q}}^g - \overbrace{\mathfrak{b} \mathfrak{x} \mathfrak{q}}^{+ \overset{g}{\mathfrak{q}}} = \mathfrak{b} \underline{R_g} \mathfrak{x} \mathfrak{q} - \mathfrak{b} \underline{R_g \mathfrak{x} \mathfrak{q}}^+ = \underline{\mathfrak{b} - \mathfrak{b}} \underline{R_g \mathfrak{x} \mathfrak{q}}^e = \text{RHS}$$

$${}^o \underline{g}^{-1} \overbrace{R_g \ltimes \P}^y = {}^o g \underline{y \rtimes g} \overbrace{R_g \ltimes o \rtimes \P}^y$$

$$\overbrace{R_g \bowtie \P}^y = {}^{yg}\P = {}^o y g {}^{o y g} \P = {}^o \underline{g g^{-1} y g} {}^{o y g} \P = {}^o \underline{g} {}^{o g} \underline{g^{-1} y g} {}^{o y g} \P = {}^o \underline{g} {}^{o g} \underline{y \bowtie g} {}^{o y g} \P = \text{RHS}$$

$$\widehat{\nabla_x^x} = \dot{x} \underline{\widehat{\nabla}} - \dot{x} \bullet \widehat{x} \bowtie \underline{\widehat{\nabla}}$$

$$\overbrace{R_g \times \mathbf{\tilde{q}}}^y = {}^{yg}\mathbf{\tilde{q}} = {}^o y g \, {}^{oyg} \mathbf{\tilde{q}} = {}^o y g \, \overbrace{R_g \times {}^o x \times \mathbf{\tilde{q}}}^y$$

$$\underline{\mathfrak{b}}^e R_g \ltimes o \rtimes \ltimes \P = \underline{\mathfrak{b}}_- R_g o \stackrel{g}{\ltimes} \stackrel{og}{\P} = \underline{\mathfrak{b}} R_g o \stackrel{g}{\ltimes} \stackrel{og}{\P} = \dot{x}^x \P$$

$$\overset{x}{\underset{y}{\overset{o}{\mathcal{L}}}} \widehat{\nabla_{\dot{x}}} = \overset{g}{\widehat{\nabla_{\dot{x}}}} = \overset{g}{\widehat{\nabla_{\mathfrak{b}_g o^g \mathbf{x}}}} = \overset{e}{\mathfrak{b}} \overset{e}{R_g} \mathbf{x} = \overset{e}{\mathfrak{b}} \overset{y}{\underset{y}{\overset{o}{yg}}} \overset{y}{\widehat{R_g \mathbf{x} o \mathbf{x} \mathbf{x}}} =$$

$$= \overline{b} \underbrace{e_o y g}_{y} e \overbrace{R_g \ltimes o \rtimes \ltimes \P} + {}^o g \overline{b} \underbrace{e R_g \ltimes o \rtimes \ltimes \P}_{y} = \overbrace{\overline{b} \underbrace{e_o y g}_{y}}^{i \varrho} x \P + {}^o g \overbrace{x \P}^{\widehat{x \P}}$$

$${}^o \underline{yg} = {}^o \underline{gg^{-1}yg} = {}^o \underline{g} {}^x \underline{g^{-1}yg} = {}^o \underline{g} {}^x \underline{y} \rtimes g$$

$$\frac{\bar{\mathfrak{b}}^e o \underline{yg}}{y} = {}^o g \frac{\bar{\mathfrak{b}}^e \cancel{x} g}{\cancel{x}} = {}^o g \frac{\cancel{\bar{\mathfrak{b}}}^e \cancel{x} g}{\cancel{x}} = {}^o g \frac{\bar{\mathfrak{b}}^e \cancel{x} g}{\cancel{x}}$$

$$\begin{aligned}
\underbrace{\mathfrak{b} \rtimes g}_{wg} &= \mathfrak{b}_w w \underline{g} \Rightarrow \overline{\mathfrak{b} \rtimes g_x} \circ \underline{g} = \overline{\mathfrak{b} \rtimes g}_{wg_o}^w = \overline{\mathfrak{b}_w w g_o}^w = \overline{a - w \dot{a} w}^w \overline{B_{-x}}^x \overline{B_x}^{1/2}_0 = \overline{a - w \dot{a} w}^w \overline{B_{-x}}_0^w x^{1/2} B_x \\
\overline{\mathfrak{b} \rtimes g_x} &= \underbrace{a - w \dot{a} w}^w \overline{B_{-x}}^0 = \underbrace{a - w \dot{a} w}_w \overline{B_{-x}}^{0-1} + \underbrace{a - 0 \dot{a} 0}_w \overline{B_{-x}}^{w-1} \\
&= -a \underbrace{B_{-x}^{0-1}}_w \underbrace{B_{-x}^{0w}}_w = -a \underbrace{B_{-x}^{0w}}_w = -a \underbrace{\dot{x}}_w + 2w \bullet \dot{x} + Q_w Q_x = -2a \bullet \dot{x}
\end{aligned}$$

$$\overline{\mathfrak{b}}=\overset{+}{\overline{\mathfrak{b}}}\times \overset{-}{\overline{\mathfrak{b}}}$$

$$\mathfrak{b}:\mathfrak{b}\;(\nabla \mathfrak{q})=-\frac{1}{2}\mathfrak{b}\overset{+}{\star}\mathfrak{b}$$

$$\underline{a-x\dot{a}x}\star\underline{b-x\dot{b}x}=a\bullet\overset{*}{\dot{b}}-b\bullet\overset{*}{\dot{a}}\in\overset{+}{\overline{\mathfrak{b}}}$$

$$G\xrightarrow{o\rtimes} D=K\sqcap G$$

$$G\mathop{\triangleleft}\limits_\infty 1\mathop{\ltimes}\limits {}_G\ltimes G\mathop{\triangleleft}\limits_\infty 1$$

$$\overset{g}{\widehat{y\ltimes \mathfrak{q}}}=\overset{yg}{\mathfrak{q}}$$

$$\overset{g}{\widehat{\mathfrak{b}\ltimes \mathfrak{q}}}={}^0\partial_t{}^{t_{\mathfrak{e}^{\mathfrak{b}} g}}\mathfrak{q}$$

$$o^g\rtimes = og$$

$${}^og_-\in K^{\mathbb C}$$

$$\dot{x}\in \underline{D}_x$$

$$x=og$$

$$o\rtimes\Big(\gamma_tg\Big)=o\gamma_tg=\underline{og}\underbrace{g^{-1}\gamma_tg}_{t}=x\underbrace{g^{-1}\gamma_tg}_{t}$$

$$\Rightarrow \underline{\mathfrak{b}R_g}o^g\rtimes=\underline{\mathfrak{b}\rtimes g}_x=\dot{x}$$

$$\underline{\mathfrak{b}}\overset{e}{\underline{R_g}}\widetilde{\mathfrak{q}}={}^og_x\underline{\mathfrak{b}\rtimes g}^x\mathfrak{q}+{}^og_x\underbrace{\mathfrak{b}\rtimes g\rtimes \mathfrak{q}}_{\mathfrak{b}\rtimes g\rtimes \mathfrak{q}}$$

$$\begin{aligned}\text{LHS} &= {}^0\partial_t{}^{t_{\mathfrak{e}^{\mathfrak{b}} g}}\widetilde{\mathfrak{q}}={}^0\partial_t{}^o\underbrace{\mathfrak{e}^{\mathfrak{b}} g}^{{}^0t_{\mathfrak{e}^{\mathfrak{b}} g}}\mathfrak{q}={}^0\partial_t{}^o\underbrace{g^t\mathfrak{e}^{\mathfrak{b}\rtimes g}}_{{}^0g^t\mathfrak{e}^{\mathfrak{b}\rtimes g}}{}^{og{}^t\mathfrak{e}^{\mathfrak{b}\rtimes g}}\mathfrak{q}={}^0\partial_t{}^o\underbrace{g_x{}^t_{\mathfrak{e}^{\mathfrak{b}\rtimes g}}{}^{x{}^t_{\mathfrak{e}^{\mathfrak{b}\rtimes g}}\mathfrak{q}}}_{\mathfrak{b}\rtimes g\rtimes \mathfrak{q}} \\ &={}^og_x{}^0\partial_t{}^x_{\mathfrak{e}^{\mathfrak{b}\rtimes g}}\mathfrak{q}+{}^og_x{}^0\partial_t{}^x_{\mathfrak{e}^{\mathfrak{b}\rtimes g}}\mathfrak{q}={}^og_x{}^0\partial_t{}^x_{\mathfrak{e}^{\mathfrak{b}\rtimes g}}\mathfrak{q}+{}^og_x{}^0\partial_t{}^x_{\mathfrak{e}^{\mathfrak{b}\rtimes g}}\mathfrak{q}=\text{RHS}\end{aligned}$$

$$x\underbrace{\nabla_{\dot{x}}\mathfrak{q}}_{\mathfrak{q}}=\underline{x\mathfrak{b}\rtimes g}^x\mathfrak{q}+\underline{\mathfrak{b}\rtimes g\rtimes \mathfrak{q}}^x$$

$$\begin{aligned} {}^o g \widehat{\nabla_{\dot{x}}} &= {}^o g \widehat{x \nabla_{\dot{x}}} = {}^g \widehat{\nabla_{\dot{x}}} = {}^g \widehat{\nabla_{\mathfrak{b}_g o^g \underline{x}}} = \mathfrak{b}_g \widehat{g \underline{\mathbf{1}}} - {}^0 \partial_t \exp t \underline{\mathfrak{b}_g \widehat{g \mathbf{1}}} \ltimes g \widetilde{\mathbf{1}} \\ &= \mathfrak{b} \underline{R_g} \widehat{g \underline{\mathbf{1}}} - {}^0 \partial_t \exp t \underline{\mathfrak{b}} \ltimes g \widetilde{\mathbf{1}} = \mathfrak{b} \underline{{}^e R_g} \widetilde{\mathbf{1}} - \underline{\mathfrak{b}} \underline{{}^e R_g} \widetilde{\mathbf{1}} = \underline{\mathfrak{b}} \underline{{}^e R_g} \widetilde{\mathbf{1}} = \underline{\mathfrak{b}} \widehat{\mathfrak{b} \ltimes \widetilde{\mathbf{1}}} = \underline{\mathfrak{b}} \underline{{}^e R_g} \ltimes \widetilde{\mathbf{1}} \end{aligned}$$