$$\overset{*}{\mathbb{L}} = Q_e \, \overset{t}{\mathbb{L}} \, Q_e$$

$$\overset{t}{\mathbb{L}} = P_{e\mathbb{L}} \, \mathbb{L}^{-1} \ \text{trans} \ \mathsf{C} \, (\mathbb{L}{:}e)$$

$$\mathbb{L} \in \mathsf{C} | \overset{|}{\mathbb{L}} \Rightarrow P \, (\mathsf{L}\mathbb{L}) = Q_e \, Q_{\mathsf{L}\mathbb{L}} = Q_e \, \overset{*}{\mathbb{L}} \, Q_{\mathsf{L}} \, \mathbb{L} = Q_e \, \overset{*}{\mathbb{L}} \, Q_e \, P_{\mathsf{L}} \, \mathbb{L} \underset{\mathsf{L} = e}{\Rightarrow} e\mathbb{L} \in {}_{\mathsf{C}}\overset{|}{\mathbb{L}}$$

$$\overset{t}{\mathbb{L}} = P_{e\mathbb{L}} \, \mathbb{L}^{-1} \Rightarrow Q_{\mathsf{L}\mathbb{L}} = Q_e \, \overset{t}{\mathbb{L}} \, Q_e \, Q_{\mathsf{L}} \, \mathbb{L} = \overset{*}{\mathbb{L}} \, Q_{\mathsf{L}} \, \mathbb{L}$$

$$\mathsf{L} \in {}_{\mathsf{C}}\overset{|}{\mathbb{L}}$$

$$\mathbb{L} \in \mathsf{C} | \overset{|}{\mathbb{L}} \Rightarrow \mathsf{L}\mathbb{L} \in {}_{\mathsf{C}}\overset{|}{\mathbb{L}}$$

$$(\mathsf{L}\mathbb{L})^{-1} = \mathsf{L}^{-1} \, \overset{t}{\mathbb{L}}^{-1}$$

$$P_{\mathsf{L}\mathbb{L}} = \overset{t}{\mathbb{L}} \, P_{\mathsf{L}} \, \mathbb{L} \ \text{inv} \ \Rightarrow \mathsf{L}\mathbb{L} \in {}_{\mathsf{C}}\overset{|}{\mathbb{L}}$$

$$(\mathsf{L}\mathbb{L})^{-1} = (\mathsf{L}\mathbb{L}) \, P_{\mathsf{L}\mathbb{L}}^{-1} = (\mathsf{L}\mathbb{L}) \, \overbrace{\overset{t}{\mathbb{L}} P_{\mathsf{L}} \mathbb{L}}^{-1} = \overbrace{\mathsf{L} P_{\mathsf{L}}}^{-1} \, \overset{t}{\mathbb{L}}^{-1} = \mathsf{L}^{-1} \, \overset{t}{\mathbb{L}}^{-1}$$

$$\bigotimes \frac{B \, (u{:}v) = {}^{u}B_v}{(u{:}v) \in \mathbb{L} \underset{\mathsf{C}}{\times} \mathbb{L} \ \text{qu-inv}} \sqsubset \mathsf{C} | \mathbb{L}$$

$$\ominus \frac{\overset{*}{\mathbb{L}} \mathbb{L}'}{\dot{\mathbb{L}} \in \mathbb{L}} \sqsubset \mathsf{E} | \mathbb{L}$$

$${}^{u}B_v^* = {}^{v}B_u$$

$$\left(\overset{*}{u} v\right)^* = \overset{*}{v} \, u$$

$$(u{:}v) \in \mathbb{L} \underset{\mathsf{C}}{\times} \mathbb{L} \Rightarrow {}^{u}B_v \in \mathsf{C} | \mathbb{L}$$

$$\mathbb{L} \in \mathsf{C} | \mathbb{L} \Rightarrow \mathbb{L}^{-1} \, {}^{u}B_v \, \mathbb{L} = {}^{u\tilde{\mathbb{L}}}B_{v\mathbb{L}}$$

$$\overset{*}{b} \, c \times \overset{*}{a} \, d = \overset{*}{b} \, \left(c \overset{*}{a} d\right) - \left(a \overset{*}{\overset{*}{d}} b\right) c$$

$$\overset{*}{b} \, c \times \mathbb{L} = \overset{*}{b} \, c \mathbb{L} - \left(b \overset{*}{\tilde{\mathbb{L}}}\right) c$$

$$\exp 2 \, \overset{*}{v} \, u = B \left(\sum_{1 \leqslant n} \frac{1}{n!} u \left(\overset{*}{v} u\right)^{n-1} : -v \right)$$

$$P_{uP_v} = P_u \, P_v \, P_u$$

$$eP_v = v^2 \in {}_{\mathbb{C}}\overset{|}{\mathbb{L}} \Rightarrow P_v \in \mathbb{C}|\overset{|}{\mathbb{L}}$$

$$\overset{t}{P}_v = P_v$$

$$P_v^* = Q_e P_v Q_e = Q_e \left(Q_e Q_v Q_e\right) = Q_e Q_{v^*} = P_{v^*}$$

$$a{:}b \in {}_{\mathbb{C}}\overset{|}{\mathbb{L}} \Rightarrow P_b^* P_a = Q_e P_b Q_e P_a = Q_b Q_a = B\left(\overset{*}{b}{:}a + b^{-1}\right)$$

$$\mathbb{L} \in \mathbb{C}|\overset{|}{\mathbb{L}} \Rightarrow a\mathbb{L} \in \mathbb{L}_{\mathbb{C}}|$$

$$\mathbb{L}^{-1} P_a \mathbb{L} = P_{e\mathbb{L}}^{-1} \overset{t}{\mathbb{L}} P_a \mathbb{L} = P_{e\mathbb{L}}^{-1} P_{a\mathbb{L}}$$

$$\otimes\frac{P_v}{v \in \mathbb{L}^{\mathbb{U}}} = \otimes\frac{Q_u Q_{\acute{u}}}{\dot{u} \in \mathbb{L}^{\mathbb{U}}} \sqsubset \mathbb{U}|\mathbb{L}$$

$$\dot{a} \in \mathbb{L}^{\mathbb{U}} \Rightarrow P_a^* = P_{a^*} = P_{a^{-1}} = P_a^{-1}$$

$$vQ_a^2 = a\left(a\overset{*}{\overset{*}{v}}a\right)a = 2\left(v\overset{*}{\mathring{a}}a\right)\overset{*}{\mathring{a}}a - v\overset{*}{\mathring{a}}\left(aQ_a\right) = v$$

$$\Rightarrow \overbrace{Q_aQ_{\acute{a}}}^{*} = \overbrace{P_{a^*}P_{\acute{a}}}^{*} = P_{\acute{a}^*}P_a = P_{\acute{a}}P_{a^*} = \overbrace{P_{a^*}P_{\acute{a}}}^{t} = \overbrace{Q_aQ_{\acute{a}}}^{t}$$

$$\otimes\frac{P_v}{v \in \mathbb{L}^{\mathbb{U}}} = \otimes\frac{Q_u Q_{\acute{u}}}{\dot{u} \in \mathbb{L}^{\mathbb{U}}} \sqsubset \mathbb{U}|\mathbb{L}$$

$$\dot{a} \in \mathbb{L}^{\mathbb{U}} \Rightarrow P_a^* = P_{a^*} = P_{a^{-1}} = P_a^{-1}$$

$$vQ_a^2 = a\left(a\overset{*}{\overset{*}{v}}a\right)a = 2\left(v\overset{*}{\mathring{a}}a\right)\overset{*}{\mathring{a}}a - v\overset{*}{\mathring{a}}\left(aQ_a\right) = v \Rightarrow \overbrace{Q_aQ_{\acute{a}}}^{*} = \overbrace{P_{a^*}P_{\acute{a}}}^{*} = P_{\acute{a}^*}P_a = P_{\acute{a}}P_{a^*} = \overbrace{P_{a^*}P_{\acute{a}}}^{t} = \overbrace{Q_aQ_{\acute{a}}}^{t}$$