

$$\mathbf{C}|\mathbb{L} = \frac{\mathbb{L} \in \mathbf{C}_{\mathbb{K}}|\mathbb{L}}{Q_u \mathbb{L} = \tilde{\mathbb{L}} Q_{u\mathbb{L}}: \underline{\mathbb{L}'\mathbb{L}} = \mathbb{L}\mathbb{L}\underline{\tilde{\mathbb{L}}'\mathbb{L}}$$

$$\mathbb{L}^* = \tilde{\mathbb{L}}^{-1} \text{ inv } \mathbf{C}|\mathbb{L}$$

$$\begin{aligned} (w\mathbb{L}) Q_{v\tilde{\mathbb{L}}} Q_{u\mathbb{L}} &= (u\mathbb{L}) \underline{v\tilde{\mathbb{L}}(w^*\mathbb{L})v\tilde{\mathbb{L}}} (u\mathbb{L}) = \underline{2w\mathbb{L}(v\tilde{\mathbb{L}})u\mathbb{L}} (v^*\mathbb{L}) u\mathbb{L} - w\mathbb{L} (v^*\mathbb{L}) (v\tilde{\mathbb{L}} Q_{u\mathbb{L}}) \\ &= 2(w\tilde{v}u) \mathbb{L} (v^*\mathbb{L}) u\mathbb{L} - w\mathbb{L} (v^*\mathbb{L}) (v Q_{u\mathbb{L}}) = 2(\underline{w\tilde{v}u}) \tilde{v}u \mathbb{L} - (w\tilde{v} (v Q_u)) \mathbb{L} = w Q_v Q_u \mathbb{L} = w Q_v \tilde{\mathbb{L}} Q_{u\mathbb{L}} \end{aligned}$$

$$\mathbf{E}|\mathbb{L} = \frac{\mathbb{L} \in \mathbf{E}_{\mathbb{K}}|\mathbb{L}}{\underline{\mathbb{L}'\mathbb{L}} = \mathbb{L}\mathbb{L}' + \mathbb{L}\underline{\tilde{\mathbb{L}}'} + \mathbb{L}'\mathbb{L}}$$

$$\mathbb{L}^* = -\tilde{\mathbb{L}} \text{ inv } \mathbf{E}|\mathbb{L}$$

$$\begin{aligned} 2u\mathbb{L} (v^* Q_w) u + v Q_w \tilde{\mathbb{L}} Q_u &= v Q_w Q_u \mathbb{L} = 2(\underline{v\tilde{v}u}) \tilde{v}u \mathbb{L} - (v\tilde{v}w Q_u) \mathbb{L} = \\ &= \underline{2v\mathbb{L}\tilde{v}u + v\underline{w\tilde{\mathbb{L}}}'u + v\tilde{v}u\mathbb{L}} \tilde{v}u + 2(v\tilde{v}u) \underline{w\tilde{\mathbb{L}}}'u + \tilde{v}u\mathbb{L} \\ &= v\mathbb{L} \tilde{v}w Q_u - v(w\tilde{\mathbb{L}}) w Q_u - 2v\tilde{v} (u\mathbb{L}\tilde{v}u) - v\tilde{v} (w\tilde{\mathbb{L}} Q_u) \\ &= v\mathbb{L} Q_w Q_u + \underline{w\tilde{v}w\tilde{\mathbb{L}}}' Q_u + 2u (v^* Q_w) u\mathbb{L} + \underline{w\tilde{v}w\tilde{\mathbb{L}}}' Q_u \Rightarrow v Q_w \tilde{\mathbb{L}} = v\mathbb{L} Q_w + 2w\tilde{v}w \tilde{\mathbb{L}} \end{aligned}$$

$$\mathbf{U}|\mathbb{L} = \frac{\mathbb{L} \in \mathbf{U}|\mathbb{L}}{\mathbb{L}^* = \mathbb{L}^{-1}: \tilde{\mathbb{L}} = \mathbb{L}: \underline{\mathbb{L}'\mathbb{L}} = \mathbb{L}\mathbb{L}\underline{\tilde{\mathbb{L}}'\mathbb{L}}$$

$$\mathbf{V}|\mathbb{L} = \frac{\mathbb{L} \in \mathbf{V}|\mathbb{L}}{\mathbb{L}^* = -\mathbb{L}: \tilde{\mathbb{L}} = \mathbb{L}: \mathbb{L}^* \underline{\mathbb{L}'\mathbb{L}} = \mathbb{L}\mathbb{L}' + \mathbb{L}\underline{\tilde{\mathbb{L}}}' + \mathbb{L}'\mathbb{L}}$$