

$$\frac{1 \mid 0}{0 \mid -1} = \frac{a \mid b}{d \mid c} \frac{1 \mid 0}{0 \mid -1} \frac{a \mid b}{d \mid c} = \frac{a \mid b}{d \mid c} \frac{1 \mid 0}{0 \mid -1} \frac{\overset{*}{a} \mid \overset{*}{d}}{\overset{*}{b} \mid \overset{*}{c}} = \frac{a\overset{*}{a} - b\overset{*}{b} \mid a\overset{*}{d} - b\overset{*}{c}}{d\overset{*}{a} - c\overset{*}{b} \mid d\overset{*}{d} - c\overset{*}{c}}$$

$${}^w g = w \frac{a \mid b}{d \mid c} = \frac{a + wd \mid b + wc}{-1} = \frac{\overset{*}{a}w + \overset{*}{d}}{-1} \frac{\overset{*}{b}w + \overset{*}{c}}{-1}$$

$$\begin{aligned} \frac{a + wd}{-1} \frac{\overset{*}{a}w + \overset{*}{d}}{-1} - \frac{b + wc}{-1} \frac{\overset{*}{b}w + \overset{*}{c}}{-1} &= \frac{a\overset{*}{a} - b\overset{*}{b}}{=1} w + \frac{a\overset{*}{d} - b\overset{*}{c}}{=0} + w \frac{d\overset{*}{a} - c\overset{*}{b}}{=0} w + w \frac{d\overset{*}{d} - c\overset{*}{c}}{=-1} = w - w = 0 \\ \Rightarrow \frac{a + wd}{-1} \frac{\overset{*}{a}w + \overset{*}{d}}{-1} &= \frac{b + wc}{-1} \frac{\overset{*}{b}w + \overset{*}{c}}{-1} \end{aligned}$$

$$c - d {}^w g = \frac{\overset{*}{b}w + \overset{*}{c}}{-1}$$

$$\frac{c - d {}^w g}{-1} \frac{\overset{*}{b}w + \overset{*}{c}}{-1} = c \frac{\overset{*}{b}w + \overset{*}{c}}{-1} - d \frac{\overset{*}{a}w + \overset{*}{d}}{-1} = \frac{c\overset{*}{b} - d\overset{*}{a}}{=0} w + \frac{c\overset{*}{c} - d\overset{*}{d}}{=1} = 1$$

$$\dot{w} {}^w g = \frac{a + wd}{-1} \dot{w} \frac{\overset{*}{b}w + \overset{*}{c}}{-1}$$

$$\frac{a + wd}{-1} {}^w g = b + wc \Rightarrow \dot{w} c = \dot{w} d {}^w g + \frac{a + wd}{-1} \dot{w} {}^w g$$

$$\Rightarrow \frac{a + wd}{-1} \dot{w} {}^w g = \dot{w} \frac{c - d {}^w g}{-1} = \dot{w} \frac{\overset{*}{b}w + \overset{*}{c}}{-1}$$

$$x \overset{u}{\dot{g}} = \frac{\overset{*}{a} + \overset{*}{d} \dot{u}}{-1} x \frac{\overset{*}{b} + \overset{*}{c}}{-1}$$