# Inversion in parts, stitching

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$$y_1 = ax_1 + bx_2 \qquad x_1 = \frac{1}{a}(y_1 - bx_2)$$

$$y_2 = cx_1 + dx_2 \qquad y_2 = \frac{c}{a}(y_1 - bx_2) + dx_2$$

$$= \frac{c}{a}y_1 + \frac{ad-bc}{a}x_2$$

So

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \longrightarrow \begin{pmatrix} \frac{1}{a} & -b/a \\ c/a & \frac{ad-bc}{a} \end{pmatrix}$$

Compare with the formula for dA:

$$\begin{array}{c|cc} \omega & a & S \\ \hline a & \alpha & \theta \\ S & \phi & \Xi \end{array} \longrightarrow \left(\begin{array}{c|cc} \alpha\omega/\sigma_a & a & S \\ \hline a & 1/\alpha & \theta/\alpha \\ S & -\phi/\alpha & (\alpha\Xi - \phi\theta)/\alpha \end{array}\right).$$

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$$\begin{pmatrix} \alpha & \beta & \theta \\ \gamma & \delta & \epsilon \\ \phi & \psi & M \end{pmatrix} \qquad \begin{aligned} y_1 &= \alpha x_1 + \beta x_2 + \theta x_3 \\ y_2 &= \gamma x_1 + \delta x_2 + \epsilon x_3 \\ y_3 &= \phi x_1 + \psi x_2 + M x_3 \end{aligned}$$

add $y_1 = x_2$, get $(1-\beta)x_2 = \alpha x_1 + \theta x_3$

So

$$y_2 = \left(\gamma + \frac{\delta\alpha}{1-\beta}\right)x_1 + \left(\epsilon + \frac{\delta\theta}{1-\beta}\right)x_3$$

$$y_3 = \left(\phi + \frac{\psi\alpha}{1-\beta}\right)x_1 + \left(M + \frac{\psi\theta}{1-\beta}\right)x_3$$

Compare with the formula for dm:

$$\begin{array}{c|ccc} \omega & a & b & S \\ \hline a & \alpha & \beta & \theta \\ b & \gamma & \delta & \epsilon \\ S & \phi & \psi & \Xi \end{array} \xrightarrow[\mu:=1-\beta]{m_c^{ab}} \left(\begin{array}{c|cc} \mu\omega & c & S \\ \hline c & \gamma + \alpha\delta/\mu & \epsilon + \delta\theta/\mu \\ S & \phi + \alpha\psi/\mu & \Xi + \theta\psi/\mu \end{array}\right).$$

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