$$\begin{split} t_1 &= \sigma(\sigma(x_1, \quad \alpha), \sigma(\gamma(x_3), x_3)) \\ t_2 &= \sigma(\sigma(\gamma(x_2), \alpha), \sigma(x_2, \quad x_3)) \end{split}$$

$$\left\{\begin{pmatrix}\sigma(\sigma(x_1,\alpha),&\sigma(\gamma(x_3),x_3))\\\sigma(\sigma(\gamma(x_2),\alpha),&\sigma(x_2,x_3))\end{pmatrix}\right\}$$

$$\begin{cases} \left(\begin{matrix} \sigma(\sigma(x_1,\alpha), & \sigma(\gamma(x_3),x_3)) \\ \sigma(\sigma(\gamma(x_2),\alpha), & \sigma(x_2,x_3)) \end{matrix} \right) \end{cases}$$
 Dekomp.
$$\Rightarrow \left\{ \left(\begin{matrix} \sigma(x_1,\alpha) \\ \sigma(\gamma(x_2),\alpha) \end{matrix} \right), \left(\begin{matrix} \sigma(\gamma(x_3),x_3) \\ \sigma(x_2,x_3) \end{matrix} \right) \right\}$$

$$\begin{cases} \left(\begin{matrix} \sigma(\sigma(x_1,\alpha), & \sigma(\gamma(x_3),x_3)) \\ \sigma(\sigma(\gamma(x_2),\alpha), & \sigma(x_2,x_3)) \end{matrix} \right) \\ \Rightarrow \left\{ \left(\begin{matrix} \sigma(x_1,\alpha) \\ \sigma(\gamma(x_2),\alpha) \end{matrix} \right), \left(\begin{matrix} \sigma(\gamma(x_3),x_3) \\ \sigma(x_2,x_3) \end{matrix} \right) \right\} \\ \text{Dekomp.} \\ \Rightarrow \left\{ \left(\begin{matrix} x_1 \\ \gamma(x_2) \end{matrix} \right), \left(\begin{matrix} \alpha \\ \alpha \end{matrix} \right), \left(\begin{matrix} \gamma(x_3) \\ x_2 \end{matrix} \right), \left(\begin{matrix} x_3 \\ x_3 \end{matrix} \right) \right\} \end{cases}$$

$$\begin{cases} \left(\begin{array}{c} \sigma(\sigma(x_1,\alpha), & \sigma(\gamma(x_3),x_3)) \\ \sigma(\sigma(\gamma(x_2),\alpha), & \sigma(x_2,x_3)) \end{array} \right) \\ \overset{\text{Dekomp.}}{\Rightarrow} \left\{ \left(\begin{array}{c} \sigma(x_1,\alpha) \\ \sigma(\gamma(x_2),\alpha) \end{array} \right), \left(\begin{array}{c} \sigma(\gamma(x_3),x_3) \\ \sigma(x_2,x_3) \end{array} \right) \right\} \\ \overset{\text{Dekomp.}}{\Rightarrow} \left\{ \left(\begin{array}{c} x_1 \\ \gamma(x_2) \end{array} \right), \left(\begin{array}{c} \alpha \\ \alpha \end{array} \right), \left(\begin{array}{c} \gamma(x_3) \\ x_2 \end{array} \right), \left(\begin{array}{c} x_3 \\ x_3 \end{array} \right) \right\} \\ \overset{\text{Elim.}}{\Rightarrow} \left\{ \left(\begin{array}{c} x_1 \\ \gamma(x_2) \end{array} \right), \left(\begin{array}{c} \alpha \\ \alpha \end{array} \right), \left(\begin{array}{c} \gamma(x_3) \\ x_2 \end{array} \right) \right\} \\ \end{cases}$$

$$\begin{cases} \left(\begin{array}{c} \sigma(\sigma(x_1,\alpha), & \sigma(\gamma(x_3),x_3)) \\ \sigma(\sigma(\gamma(x_2),\alpha), & \sigma(x_2,x_3)) \end{array} \right) \\ \stackrel{\text{Dekomp.}}{\Rightarrow} \left\{ \left(\begin{array}{c} \sigma(x_1,\alpha) \\ \sigma(\gamma(x_2),\alpha) \end{array} \right), \left(\begin{array}{c} \sigma(\gamma(x_3),x_3) \\ \sigma(x_2,x_3) \end{array} \right) \right\} \\ \stackrel{\text{Dekomp.}}{\Rightarrow} \left\{ \left(\begin{array}{c} x_1 \\ \gamma(x_2) \end{array} \right), \left(\begin{array}{c} \alpha \\ \alpha \end{array} \right), \left(\begin{array}{c} \gamma(x_3) \\ x_2 \end{array} \right), \left(\begin{array}{c} x_3 \\ x_3 \end{array} \right) \right\} \\ \stackrel{\text{Elim.}}{\Rightarrow} \left\{ \left(\begin{array}{c} x_1 \\ \gamma(x_2) \end{array} \right), \left(\begin{array}{c} \alpha \\ \alpha \end{array} \right), \left(\begin{array}{c} \gamma(x_3) \\ x_2 \end{array} \right) \right\} \\ \stackrel{\text{Dekomp.}}{\Rightarrow} \left\{ \left(\begin{array}{c} x_1 \\ \gamma(x_2) \end{array} \right), \left(\begin{array}{c} \gamma(x_3) \\ x_2 \end{array} \right) \right\} \\ \stackrel{\text{Dekomp.}}{\Rightarrow} \left\{ \left(\begin{array}{c} x_1 \\ \gamma(x_2) \end{array} \right), \left(\begin{array}{c} \gamma(x_3) \\ x_2 \end{array} \right) \right\} \end{cases}$$

$$\begin{cases} \left(\begin{matrix} \sigma(\sigma(x_1,\alpha), & \sigma(\gamma(x_3),x_3)) \\ \sigma(\sigma(\gamma(x_2),\alpha), & \sigma(x_2,x_3)) \end{matrix} \right) \end{cases}$$
 Dekomp.
$$\Rightarrow \left\{ \left(\begin{matrix} \sigma(x_1,\alpha) \\ \sigma(\gamma(x_2),\alpha) \end{matrix} \right), \left(\begin{matrix} \sigma(\gamma(x_3),x_3) \\ \sigma(x_2,x_3) \end{matrix} \right) \right\}$$
 Dekomp.
$$\Rightarrow \left\{ \left(\begin{matrix} x_1 \\ \gamma(x_2) \end{matrix} \right), \left(\begin{matrix} \alpha \\ \alpha \end{matrix} \right), \left(\begin{matrix} \gamma(x_3) \\ x_2 \end{matrix} \right), \left(\begin{matrix} x_3 \\ x_3 \end{matrix} \right) \right\}$$
 Elim.
$$\Rightarrow \left\{ \left(\begin{matrix} x_1 \\ \gamma(x_2) \end{matrix} \right), \left(\begin{matrix} \alpha \\ \alpha \end{matrix} \right), \left(\begin{matrix} \gamma(x_3) \\ x_2 \end{matrix} \right) \right\}$$
 Dekomp.
$$\Rightarrow \left\{ \left(\begin{matrix} x_1 \\ \gamma(x_2) \end{matrix} \right), \left(\begin{matrix} \gamma(x_3) \\ \alpha \end{matrix} \right) \right\}$$
 Vert.
$$\Rightarrow \left\{ \left(\begin{matrix} x_1 \\ \gamma(x_2) \end{matrix} \right), \left(\begin{matrix} x_2 \\ \gamma(x_3) \end{matrix} \right) \right\}$$

Aufgabe 3 (cont.)

$$\left\{ \begin{pmatrix} x_1 \\ \gamma(x_2) \end{pmatrix}, \begin{pmatrix} x_2 \\ \gamma(x_3) \end{pmatrix} \right\}$$

Aufgabe 3 (cont.)

$$\begin{cases} \begin{pmatrix} x_1 \\ \gamma(x_2) \end{pmatrix}, \begin{pmatrix} x_2 \\ \gamma(x_3) \end{pmatrix} \\ \end{cases}$$
 Subst.
$$\begin{cases} \begin{pmatrix} x_1 \\ \gamma(\gamma(x_3)) \end{pmatrix}, \begin{pmatrix} x_2 \\ \gamma(x_3) \end{pmatrix} \\ \end{cases}$$

Aufgabe 3 (cont.)

$$\begin{split} \left\{ \begin{pmatrix} x_1 \\ \gamma(x_2) \end{pmatrix}, \begin{pmatrix} x_2 \\ \gamma(x_3) \end{pmatrix} \right\} \\ & \overset{\text{Subst.}}{\Rightarrow} \left\{ \begin{pmatrix} x_1 \\ \gamma(\gamma(x_3)) \end{pmatrix}, \begin{pmatrix} x_2 \\ \gamma(x_3) \end{pmatrix} \right\} \\ & x_1 \mapsto \gamma(\gamma(x_3)) \qquad x_2 \mapsto \gamma(x_3) \qquad x_3 \mapsto x_3 \end{split}$$