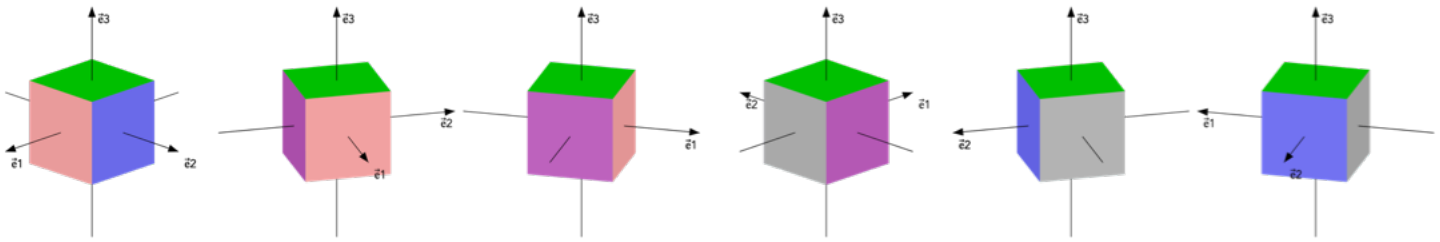
Scaling

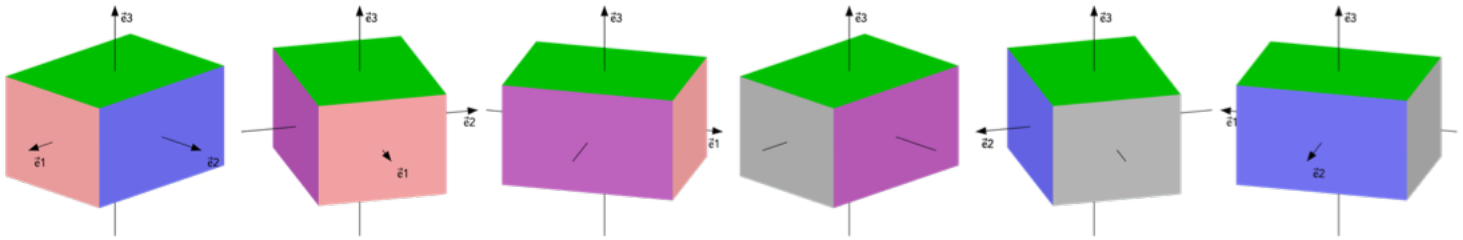
has the following form: $\begin{bmatrix} s_1 & 0 & 0 \\ 0 & s_2 & 0 \\ 0 & 0 & s_3 \end{bmatrix}$

$$\begin{bmatrix} s_1 & 0 & 0 \\ 0 & s_2 & 0 \\ 0 & 0 & s_3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} s_1 x_1 \\ s_2 x_2 \\ s_3 x_3 \end{bmatrix}$$

$$x_1' = s_1 x_1, \quad x_2' = s_2 x_2, \quad x_3' = s_3 x_3$$



$$A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 1.5 & 0 \\ 0 & 0 & 1.2 \end{bmatrix}$$

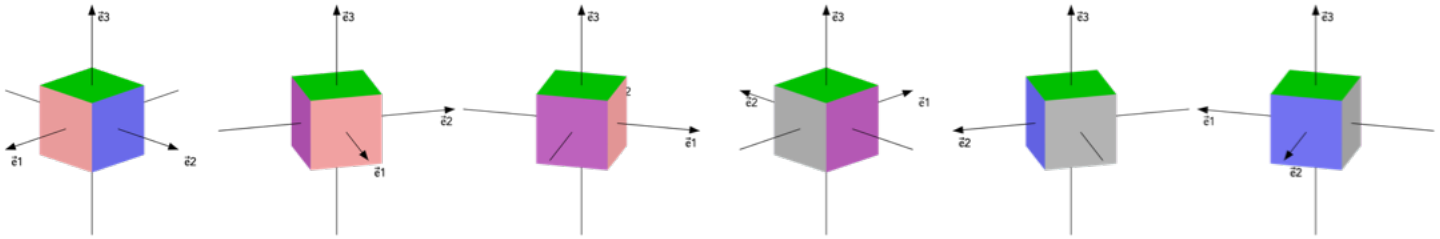


Elementary shear of x_1 by x_2

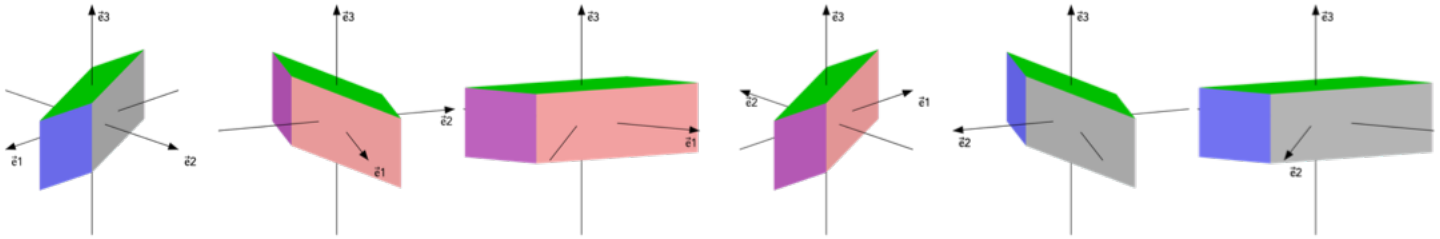
has the following form: $\begin{bmatrix} 1 & s & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & s & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 + s\,x_2 \\ x_2 \\ x_3 \end{bmatrix}$$

$$x_1' = x_1 + sx_2, \quad x_2' = x_2, \quad x_3' = x_3$$



$$A = \begin{bmatrix} 1 & 2 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

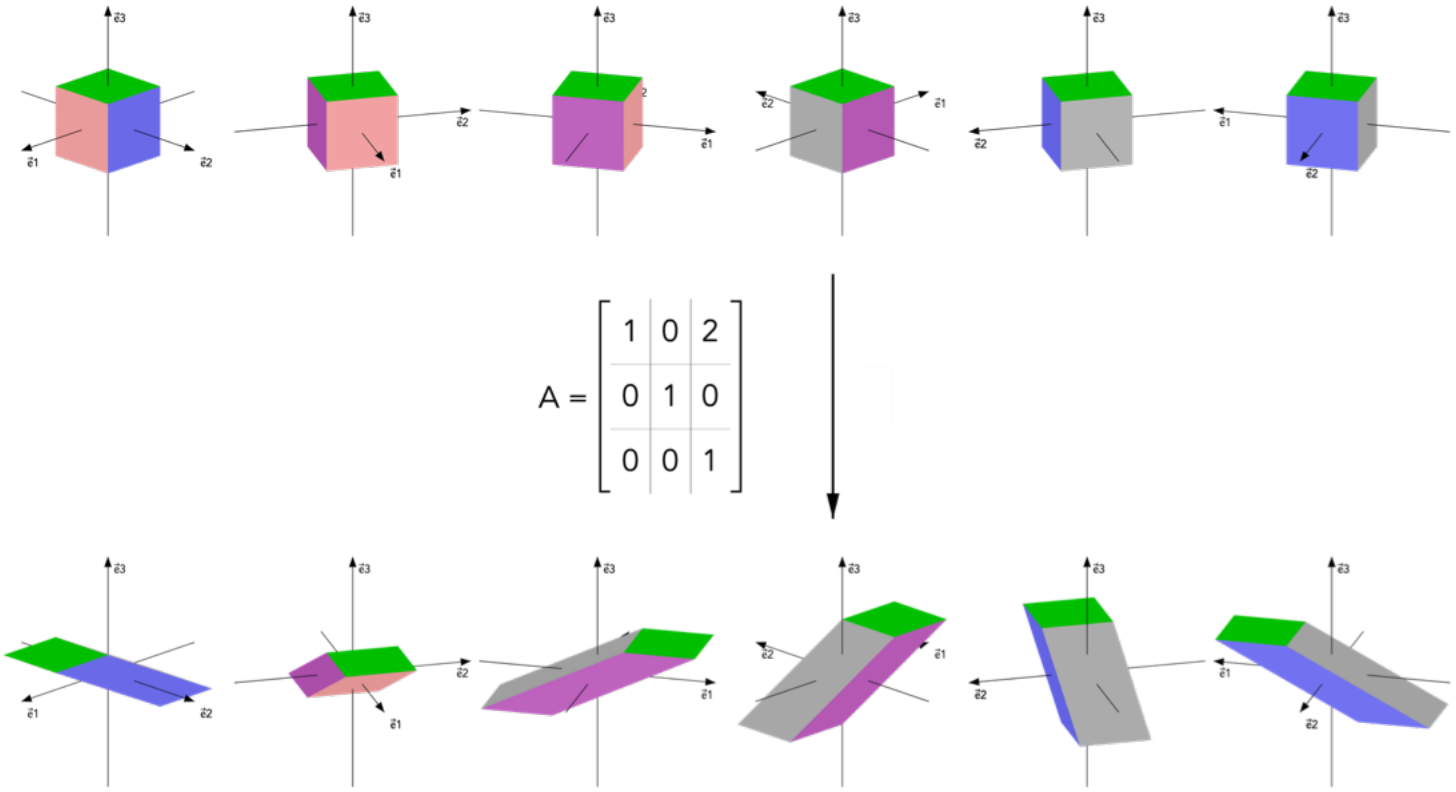


Elementary shear of x_1 by x_3

has the following form: $\begin{bmatrix} 1 & 0 & s \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & 0 & s \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 + s\,x_3 \\ x_2 \\ x_3 \end{bmatrix}$$

$$x_1' = x_1 + sx_3, \quad x_2' = x_2, \quad x_3' = x_3$$



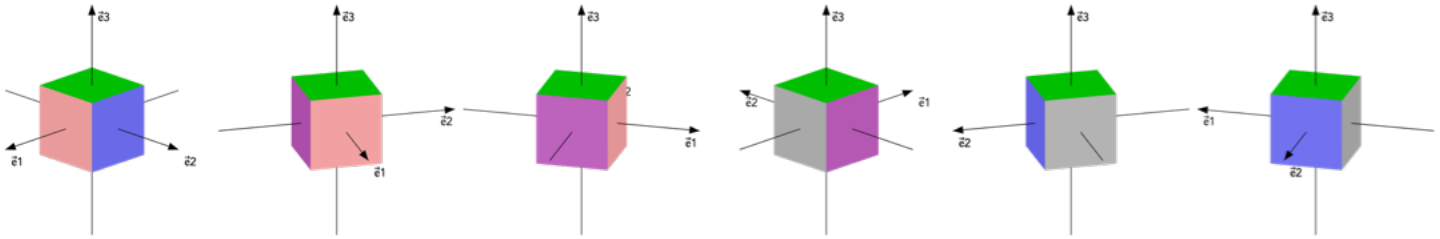
$$A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Elementary shear of x_2 by x_1

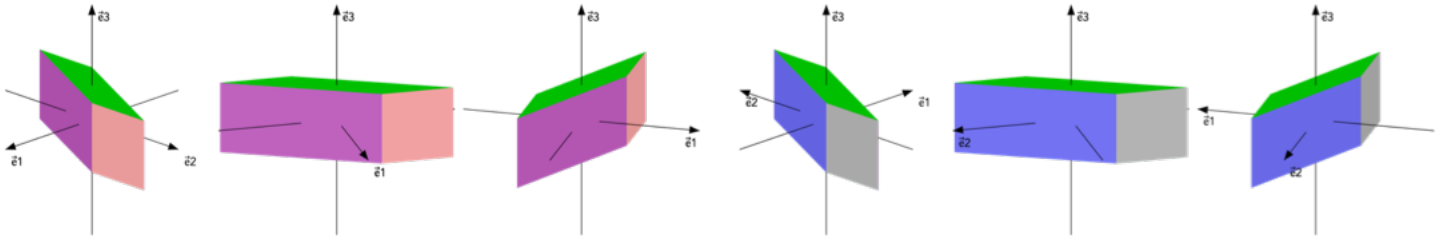
has the following form: $\begin{bmatrix} 1 & 0 & 0 \\ s & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & 0 & 0 \\ s & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 \\ s\,x_1 + x_2 \\ x_3 \end{bmatrix}$$

$$x_1' = x_1, \quad x_2' = x_2 + sx_1, \quad x_3' = x_3$$



$$A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

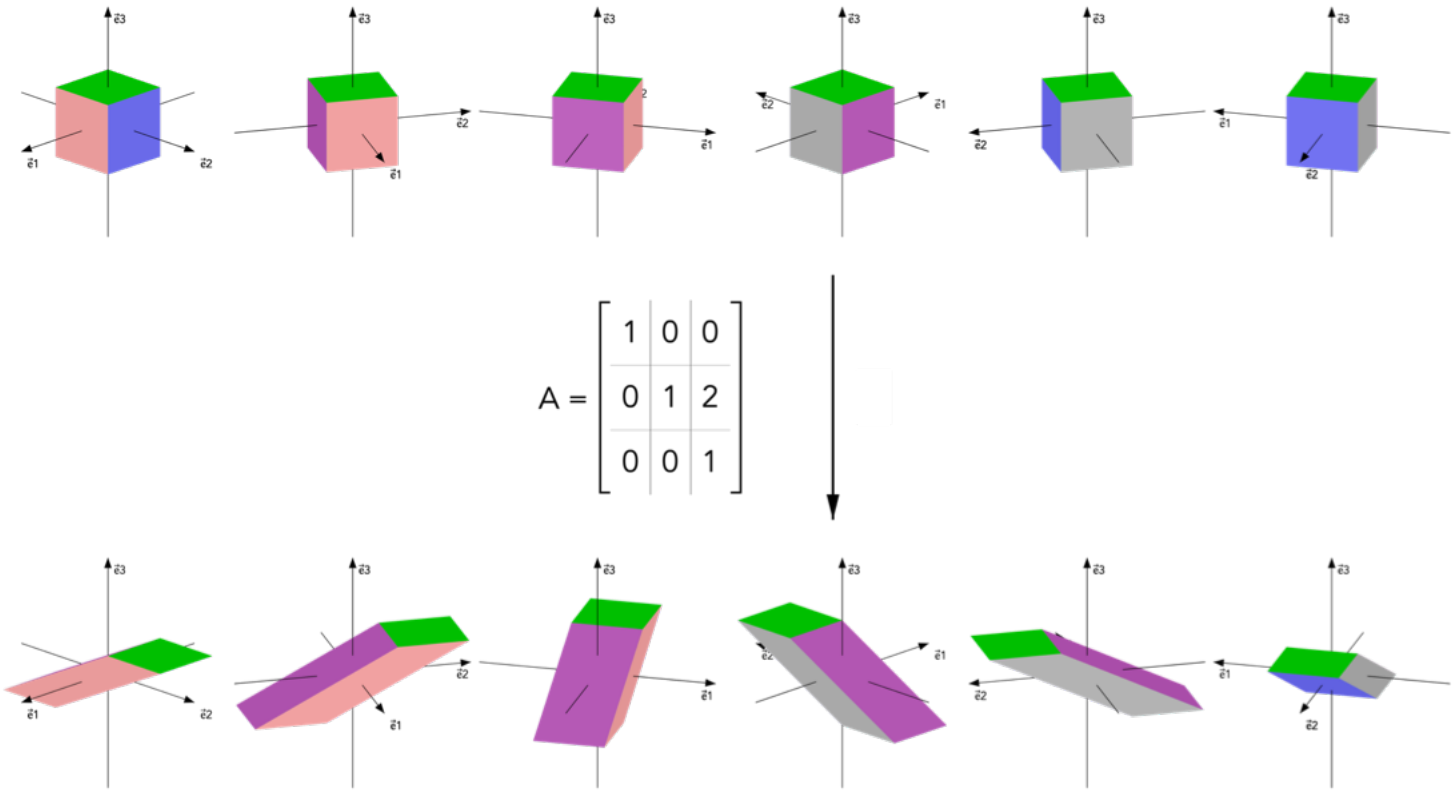


Elementary shear of x_2 by x_3

has the following form: $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & s \\ 0 & 0 & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & s \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 \\ x_2 + s\,x_3 \\ x_3 \end{bmatrix}$$

$$x_1' = x_1, \quad x_2' = x_2 + sx_3, \quad x_3' = x_3$$

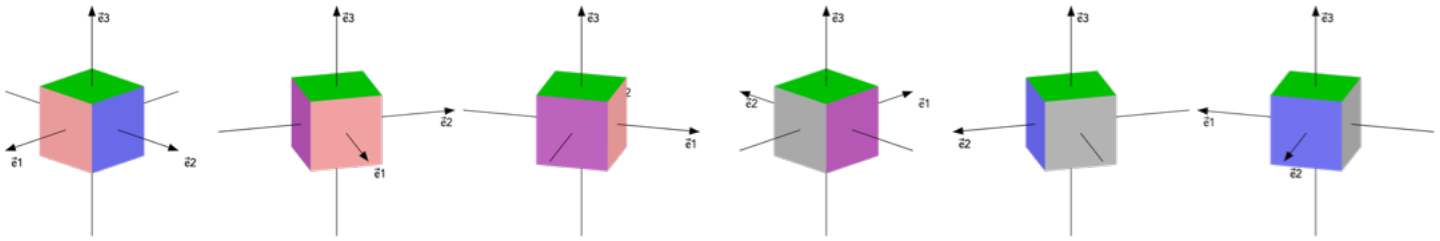


Elementary shear of x_3 by x_1

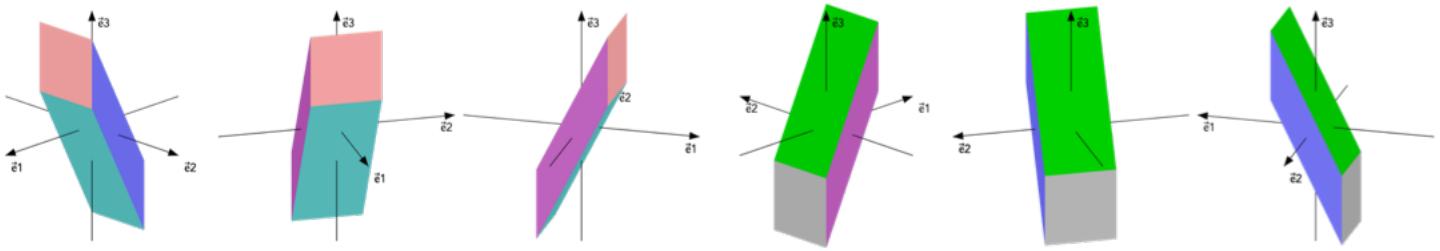
has the following form: $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ s & 0 & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ s & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 \\ x_2 \\ s\,x_1 + x_3 \end{bmatrix}$$

$$x_1' = x_1, \quad x_2' = x_2, \quad x_3' = x_3 + sx_1$$



$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 2 & 0 & 1 \end{bmatrix}$$

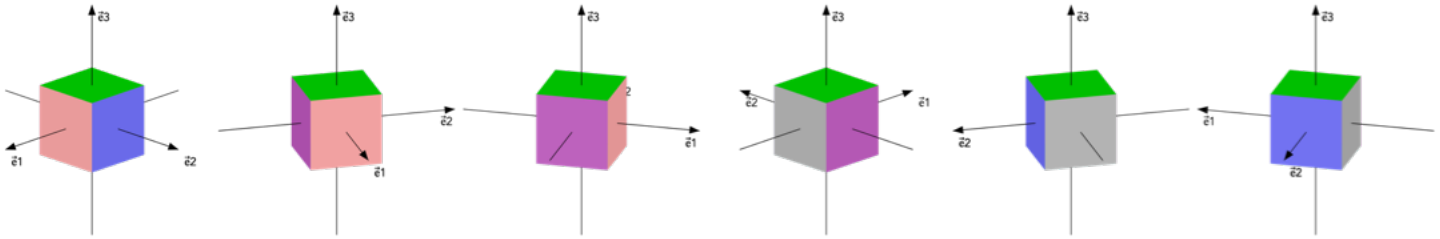


Elementary shear of x_3 by x_2

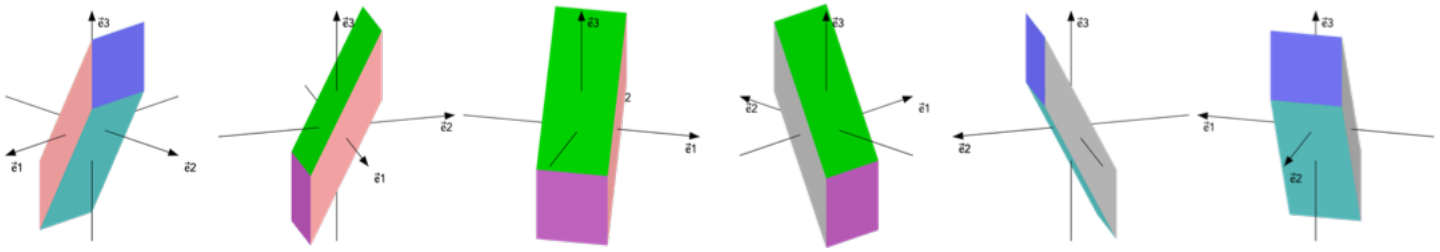
has the following form: $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & s & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & s & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 \\ x_2 \\ s\,x_2 + x_3 \end{bmatrix}$$

$$x_1' = x_1, \quad x_2' = x_2, \quad x_3' = x_3 + sx_2$$



$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 2 & 1 \end{bmatrix}$$

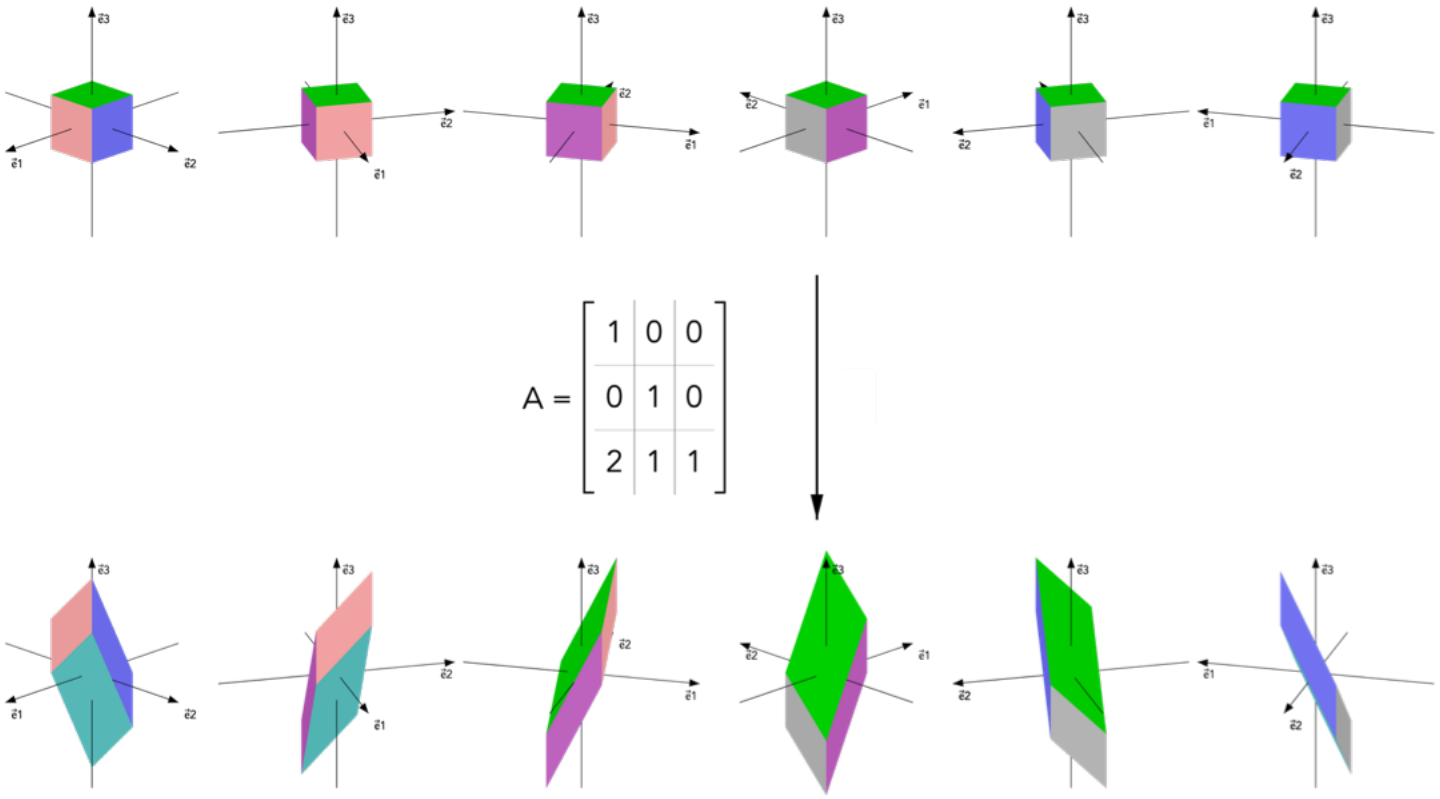


Shear x_3 by x_1 and x_2

has the following form: $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ s_1 & s_2 & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ s_1 & s_2 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 \\ x_2 \\ s_1 x_1 + s_2 x_2 + x_3 \end{bmatrix}$$

$$x_1' = x_1, \quad x_2' = x_2, \quad x_3' = x_3 + s_1 x_1 + s_2 x_2$$



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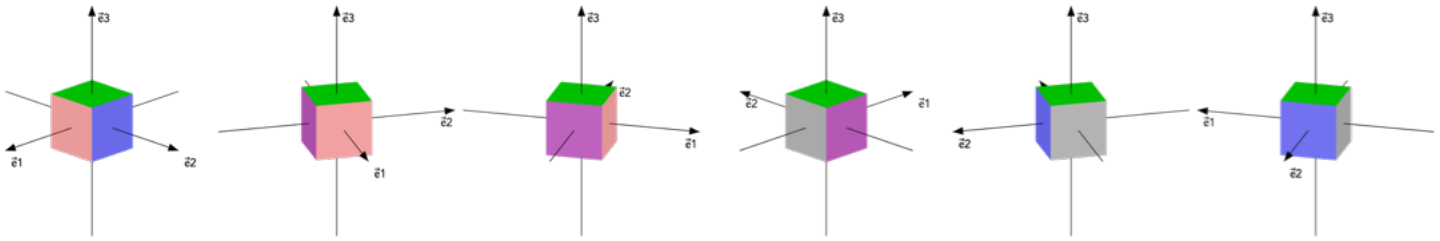
Shear x_2 by x_1 and x_3

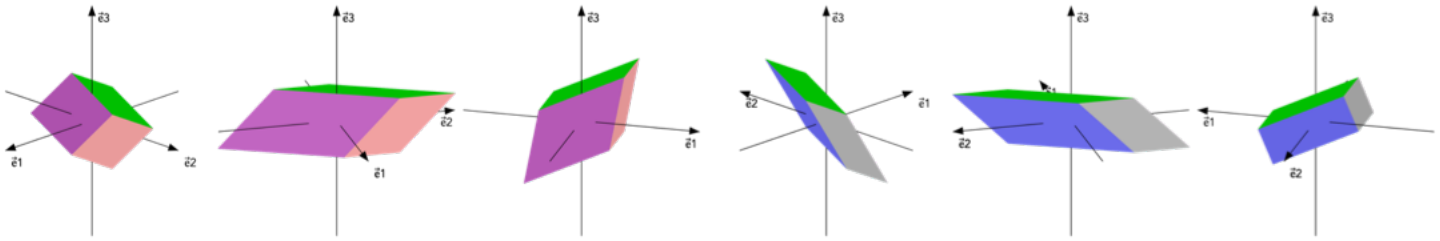
has the following form: $\begin{bmatrix} 1 & 0 & 0 \\ s_1 & 1 & s_2 \\ 0 & 0 & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & 0 & 0 \\ s_1 & 1 & s_2 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 \\ s_1 x_1 + x_2 + s_2 x_3 \\ x_3 \end{bmatrix}$$

$$x_1' = x_1, \quad x_2' = x_2 + s_1 x_1 + s_2 x_3, \quad x_3' = x_3$$



$$A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

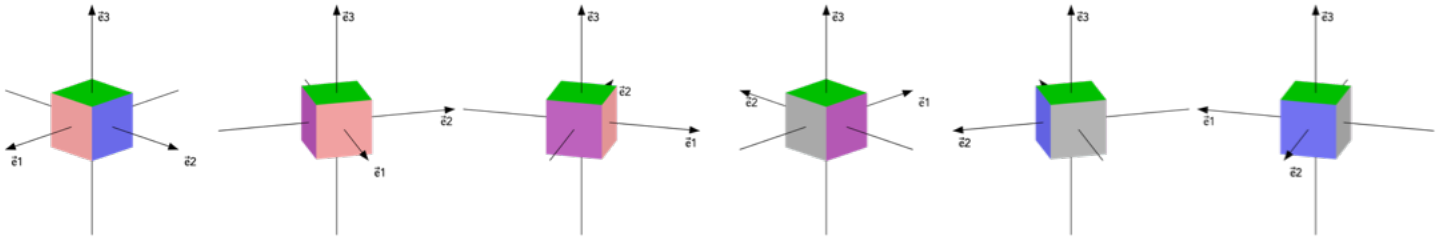


Shear x_1 by x_2 and x_3

has the following form: $\begin{bmatrix} 1 & s_1 & s_2 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$$\begin{bmatrix} 1 & s_1 & s_2 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_1 + s_1 x_2 + s_2 x_3 \\ x_2 \\ x_3 \end{bmatrix}$$

$$x_1' = x_1 + s_1 x_2 + s_2 x_3, \quad x_2' = x_2, \quad x_3' = x_3$$



$$A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$