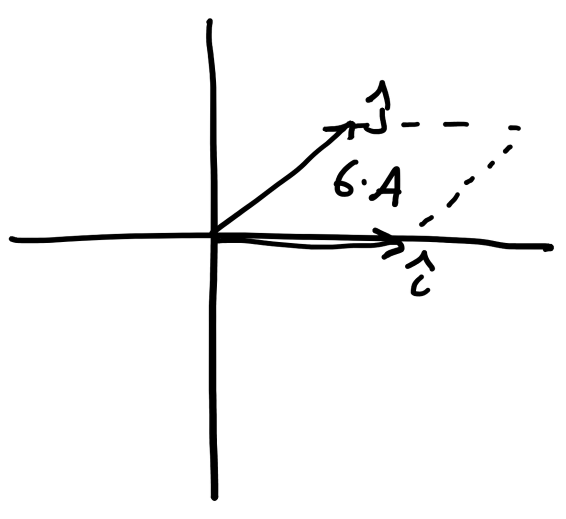
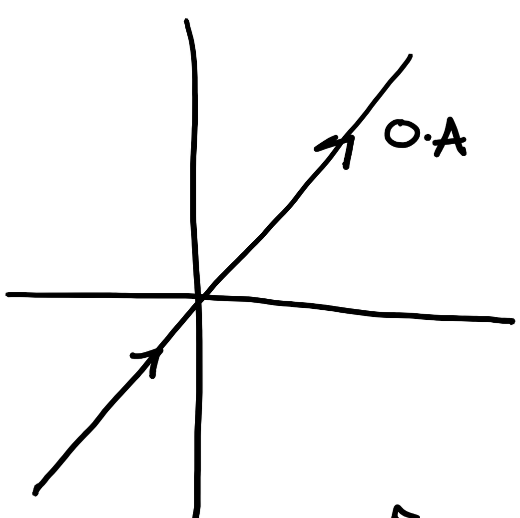
The Determinant
пятница, 29 марта 2019 г. 23:53

"The purpose of computation is insight not numbers."
Richard Hammond.

The Determinant of a Transformation

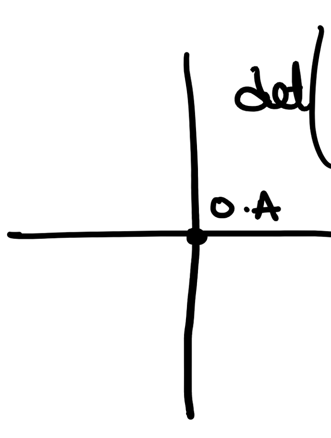
$$\det\left(\begin{bmatrix} 3 & 2 \\ 0 & 2 \end{bmatrix}\right) = 6$$





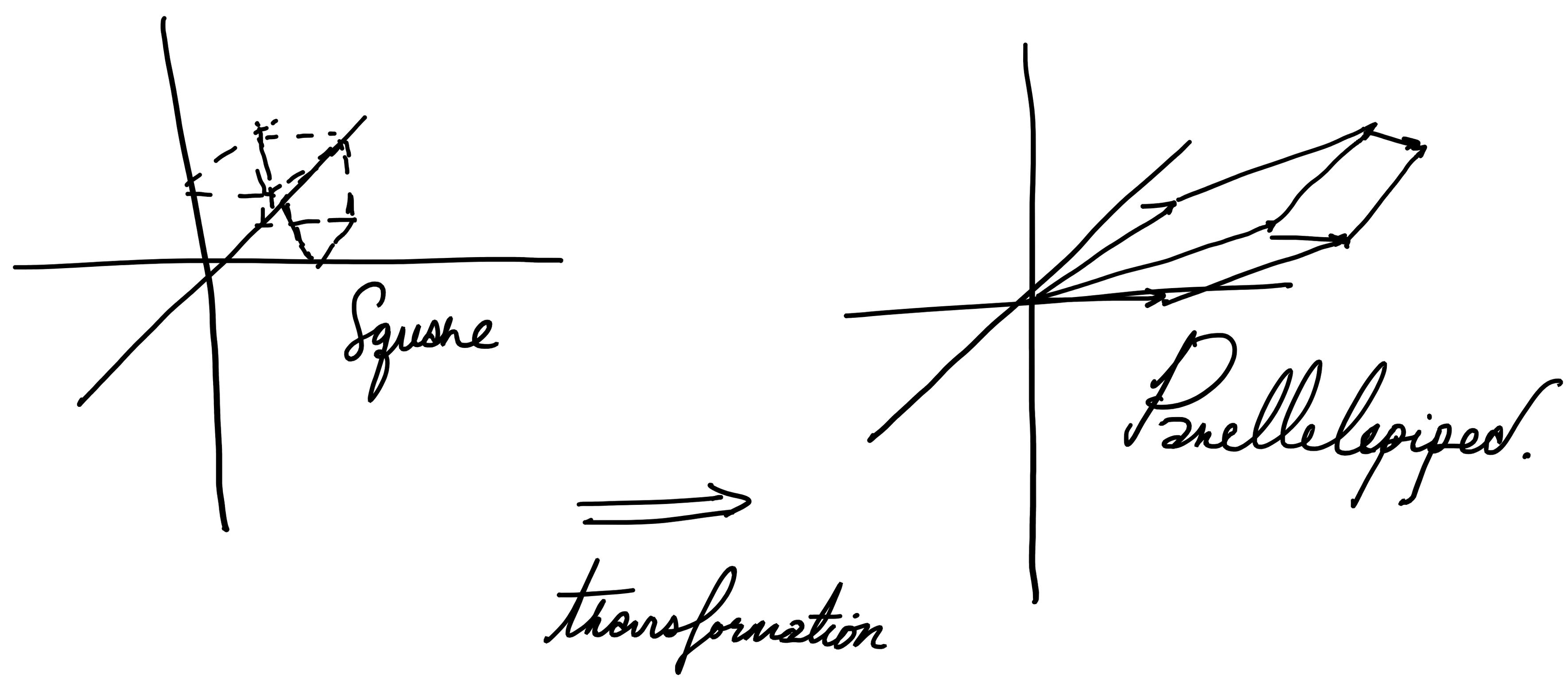
$$\det\left(\begin{bmatrix} 4 & 2 \\ 2 & 1 \end{bmatrix}\right) = 0$$

$$\det\left(\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}\right) = 0$$



$\det(M) = 0$ indicates transformation has moved basis vectors into a lower dimension.

Negative determinants indicate inversion of space!



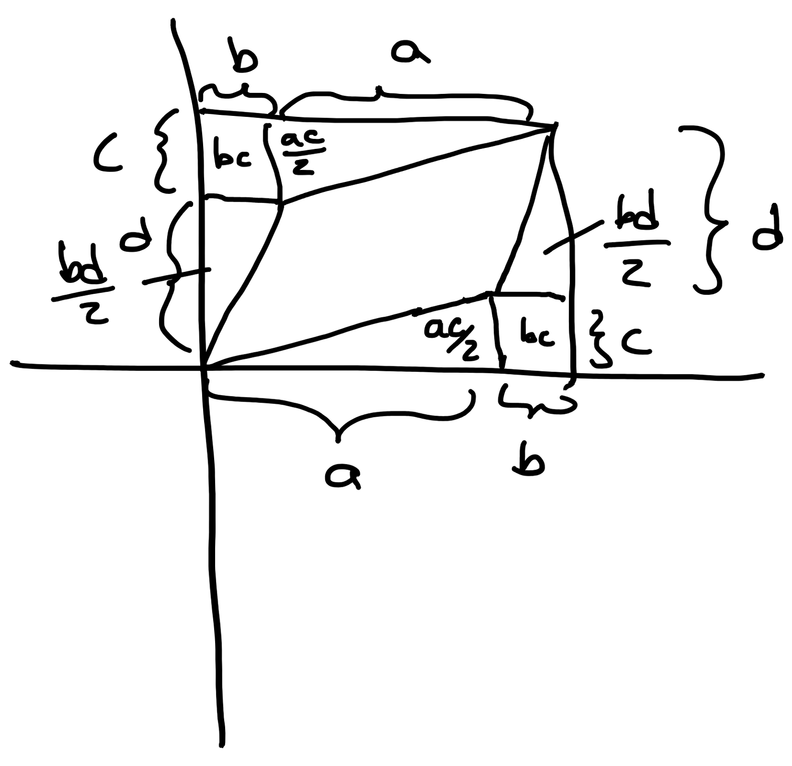
$$\det\left(\begin{bmatrix} 0 & 0.5 & 1 \\ 1 & 0.5 & 1 \\ 0.5 & 0.5 & 0 \end{bmatrix}\right) = \text{volume of parallelepiped.}$$

$\det(M_3) = 0$, means zero volume either a plane, line or point

Negative 3d Determinants

(Regular Orientation) (Flipped Orientation)

$$\det\left(\begin{bmatrix} a & b \\ c & d \end{bmatrix}\right) = ad - bc$$



x displacement of basis vector.

$$\det\left(\begin{bmatrix} a & b \\ c & d \end{bmatrix}\right) = (a+b)(c+d) - ac - bd - 2bc$$

y displacement $= ad - bc$

Det of 3d Matrix

$$\det\left(\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}\right) = a\det\left(\begin{bmatrix} e & f \\ h & i \end{bmatrix}\right) - b\det\left(\begin{bmatrix} d & f \\ g & i \end{bmatrix}\right) + c\det\left(\begin{bmatrix} d & e \\ g & h \end{bmatrix}\right)$$

$$\det(M_1 M_2) = \det(M_1)\det(M_2)$$