Jacobian

Jacobian matrix fundamentally represents what a transformation looks like when you zoom in, near a specific point.

$$\begin{vmatrix} df_1/dx & df_1/dy \\ df_2/dx & df_2/dy \end{vmatrix}$$

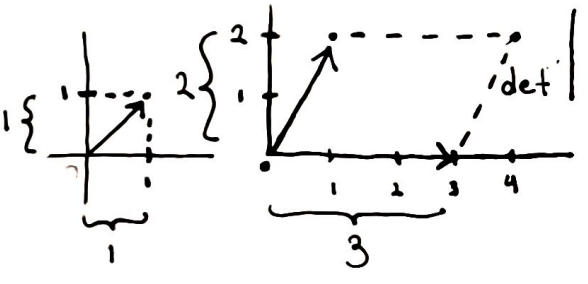
→ axis increase

= Jacobian matrix

↓ function increase

Jacobian Determinant

This determines the area, hence the determinat is a scaling factor.



$$\begin{vmatrix} 3 & 1 \\ 0 & 2 \end{vmatrix} = 3 \cdot 2 - 1 \cdot 0 = 6$$

6 is a scaling factor.
We went from area 1 to 6.

Linear Maps/Transformations

1. Parallel lines stay as parallel lines.
2. Even spacings are preserved.
3. Origin is fixed.