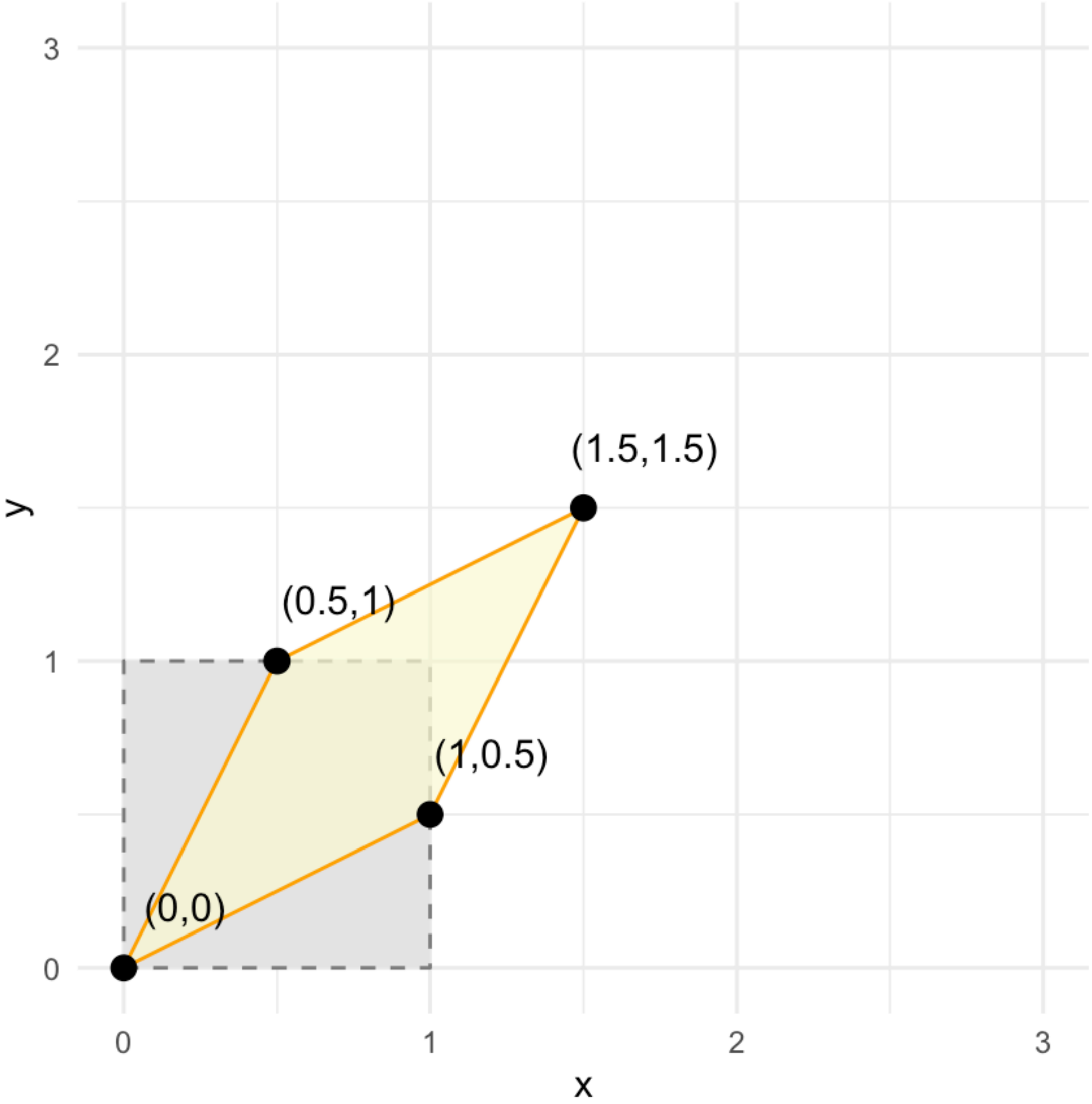
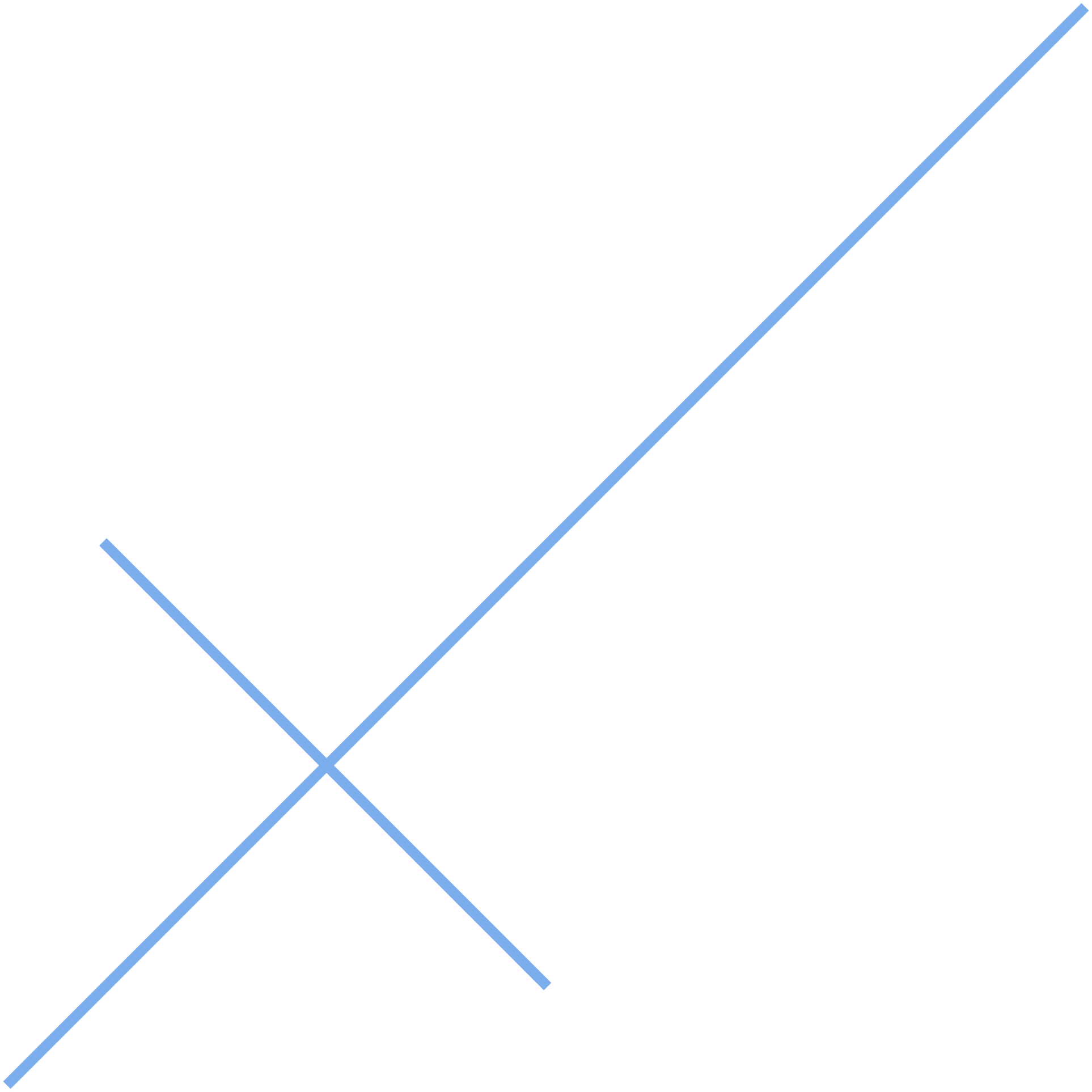
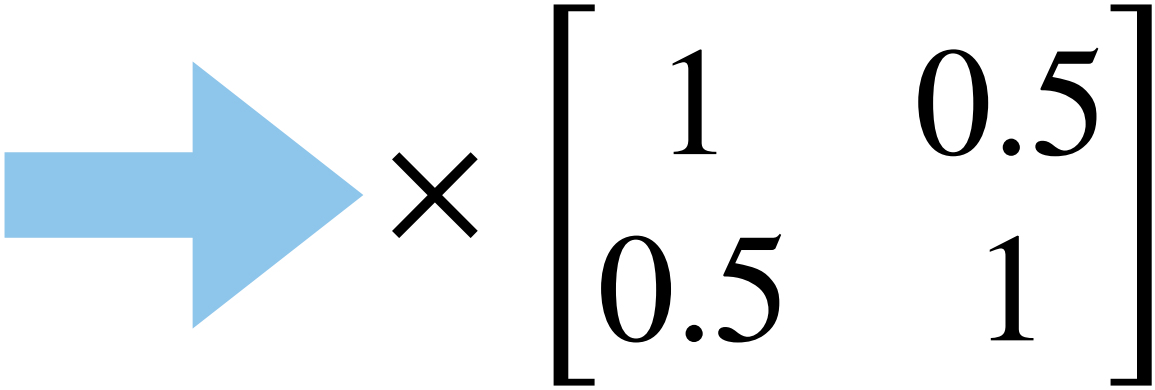

3
2
1
0
y
(1.5,1.5)
(0.5,1)
(1,0.5)
(0,0)
0
1
2
3
x

# Eigendecomposition




×
1
0.5
0.5
1

**‘stretch’ and ‘squish’**

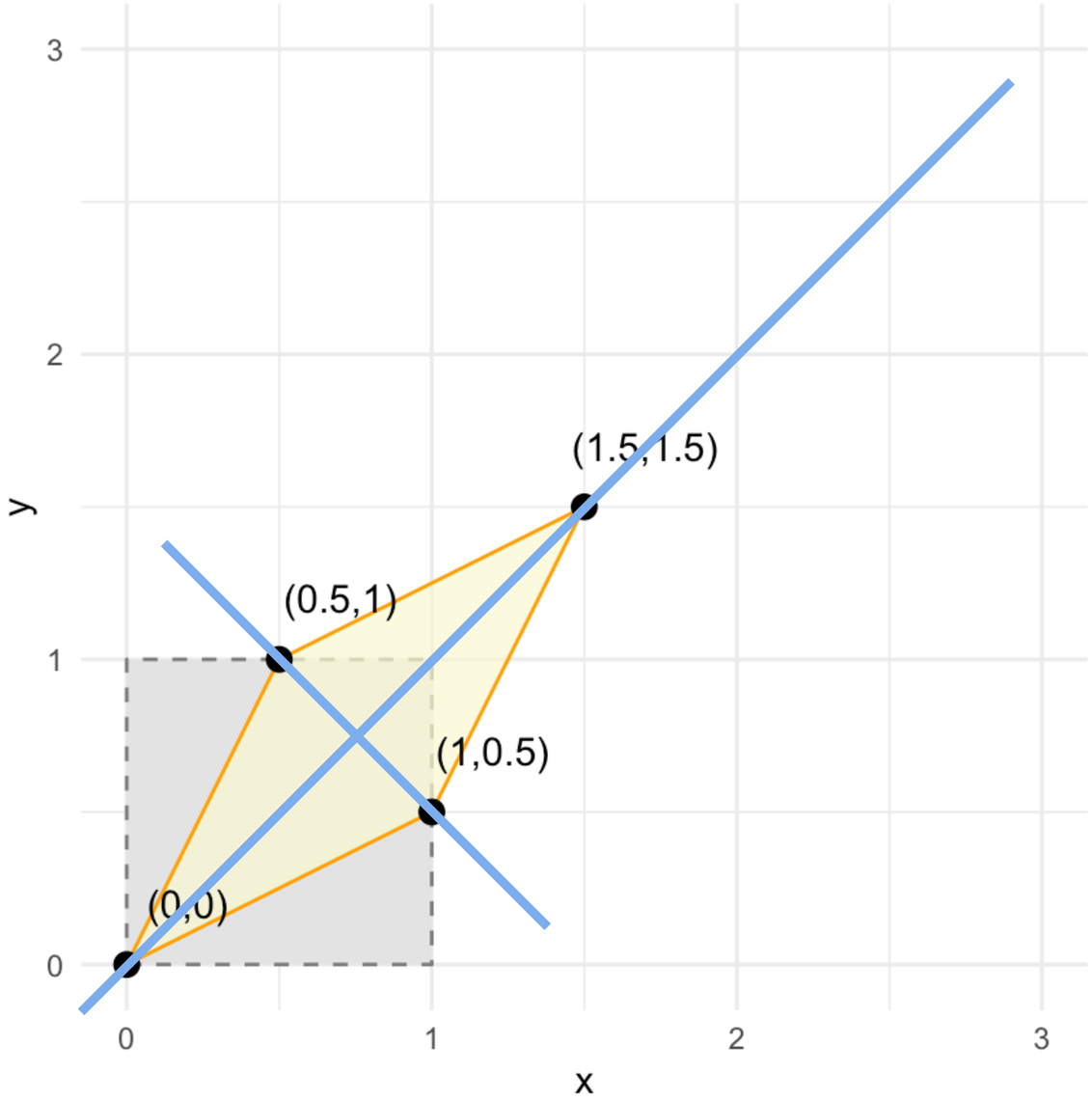
direction? (eigenvectors)

how much? (eigenvalues)

# Eigendecomposition

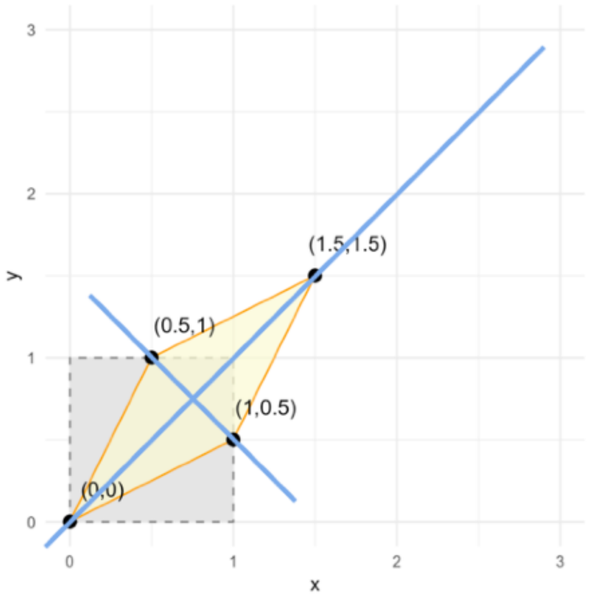
$$\rightarrow \times \begin{bmatrix} 1 & 0.5 \\ 0.5 & 1 \end{bmatrix}$$

**‘stretch’ and ‘squish’**
direction? (eigenvectors)
how much? (eigenvalues)




# Eigendecomposition

to find the eigenvalues $\lambda$ we can solve the so called **characteristic polynomial**




where

$$|A - \lambda I| = (1 - \lambda)(1 - \lambda) - (0.5)(0.5)$$

$$= \lambda^2 - 2\lambda + 0.75$$

solve the roots to get **eigenvalues**: $(\lambda - 1.5)(\lambda - 0.5) \implies \lambda = [1.5,\ 0.5]$