PRINCIPAL COMPONENTS ANALYSIS (PCA)

FREDY EDUARDO ALONZO MONDRAGON
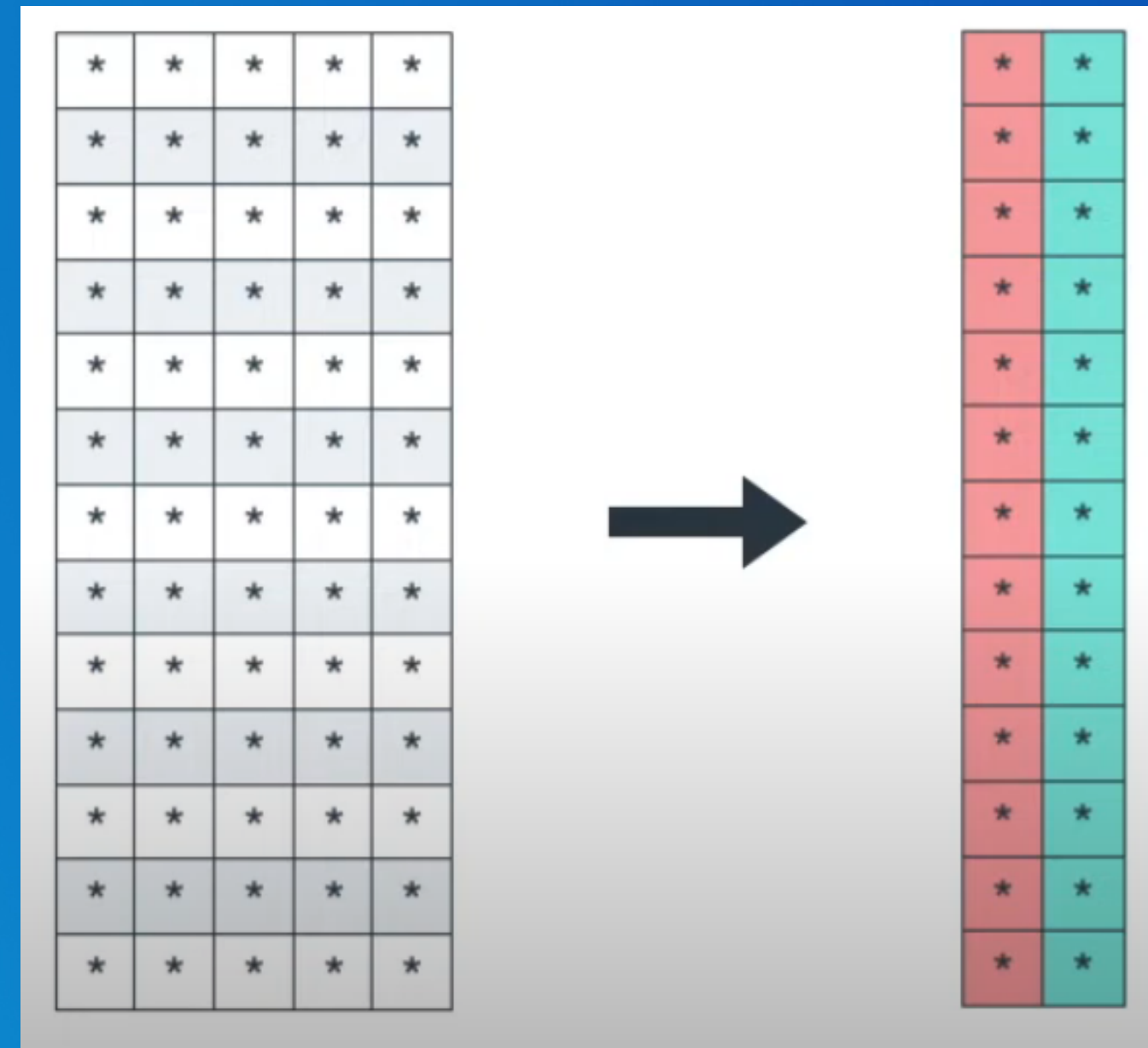
JESUS EDUARDO CASAS NAVARRO

JESUS CANUL
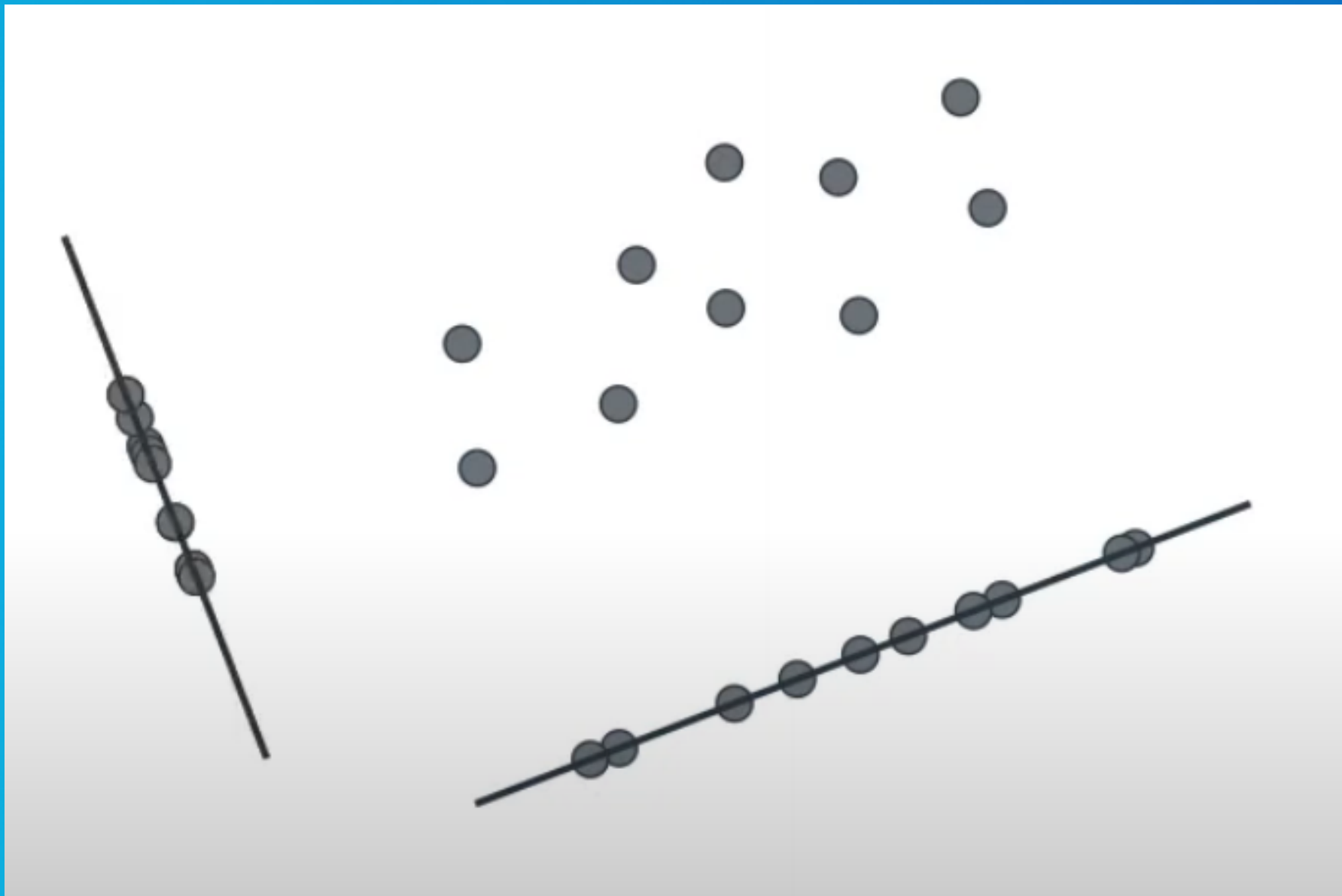
ESTEBAN RODRIGUEZ KUMUL

DIMENSIONALITY REDUCTION

Dimensionality reduction simply refers to the process of reducing the number of attributes in a dataset while keeping as much of the variation in the original dataset as possible
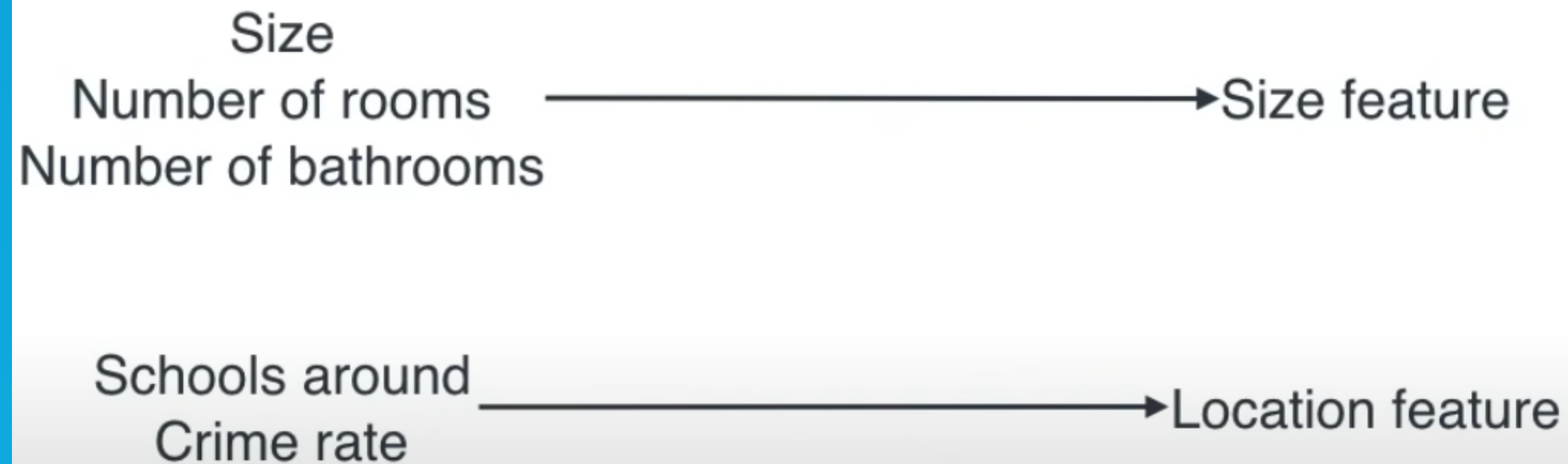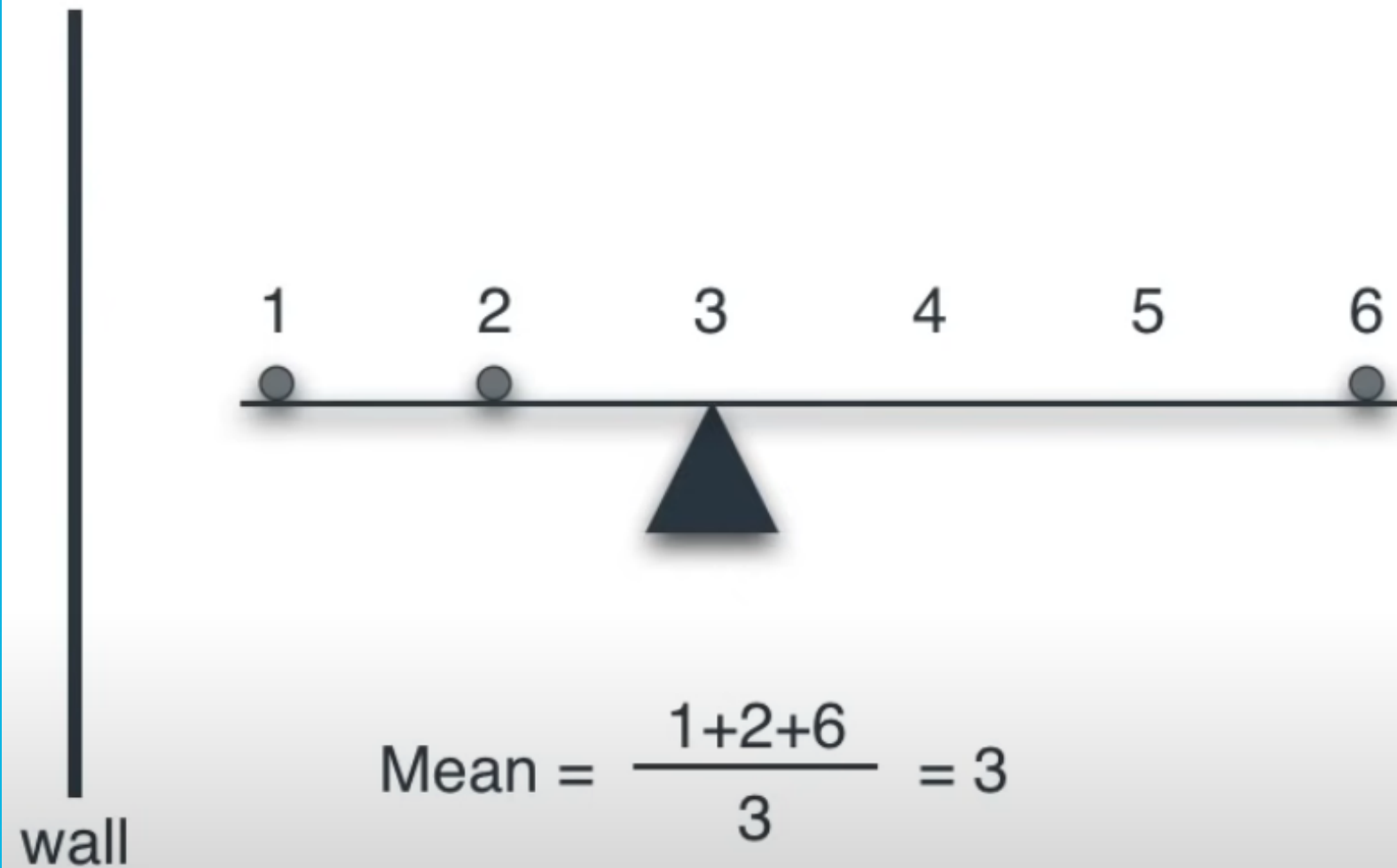
DIMENSIONALITY REDUCTION

- **2D**
- **3D**
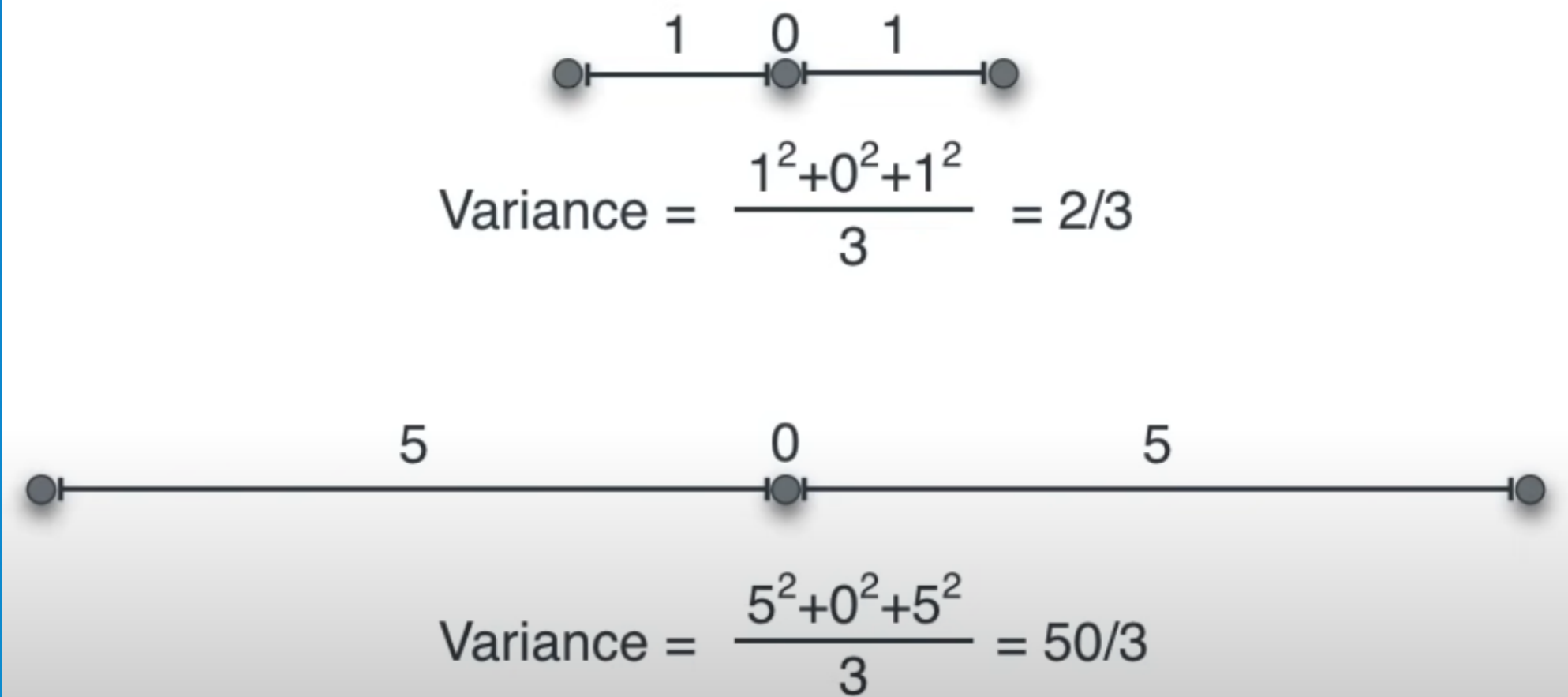
DIMENSIONALITY REDUCTION

MEAN, VARIANCE, COVARIANCE

Mean

$$\text{Mean} = \frac{1+2+6}{3} = 3$$

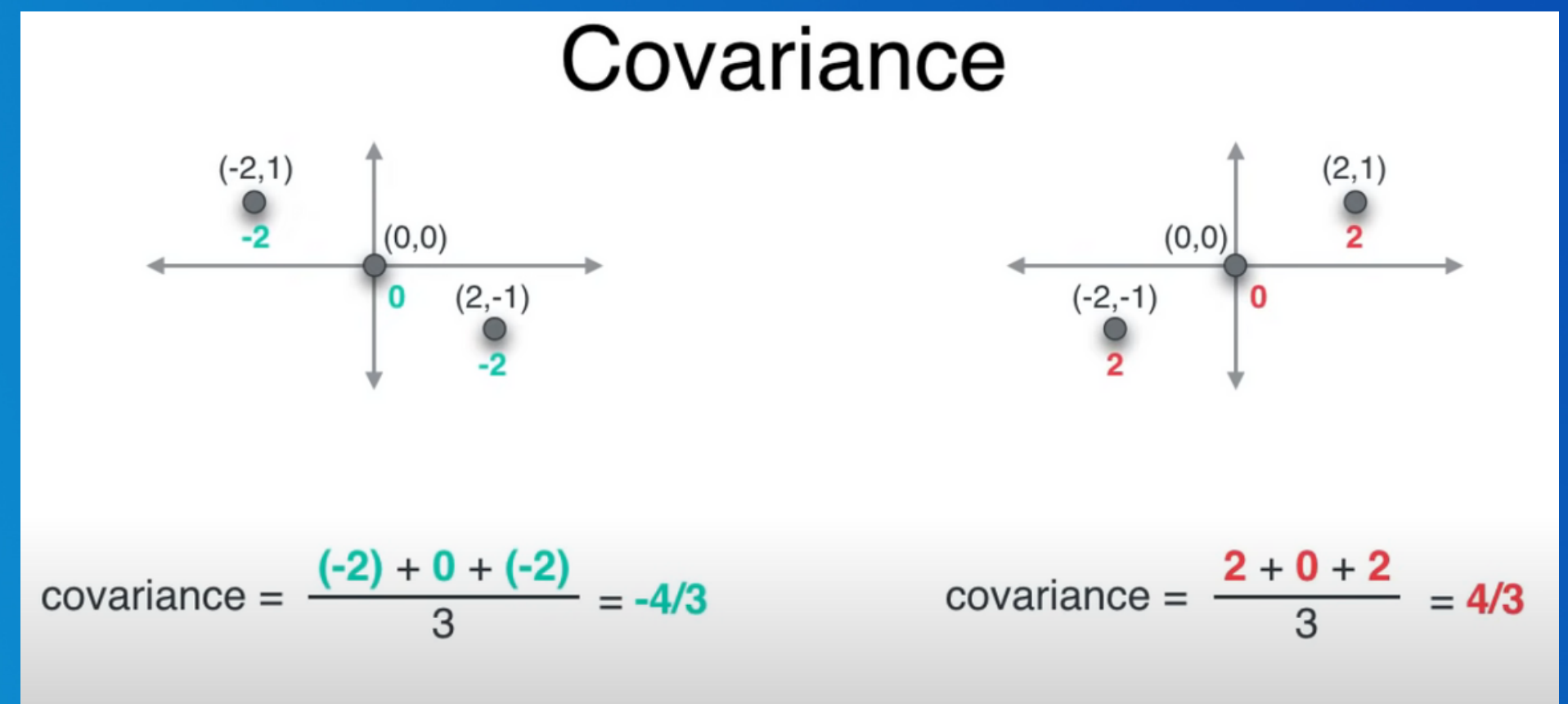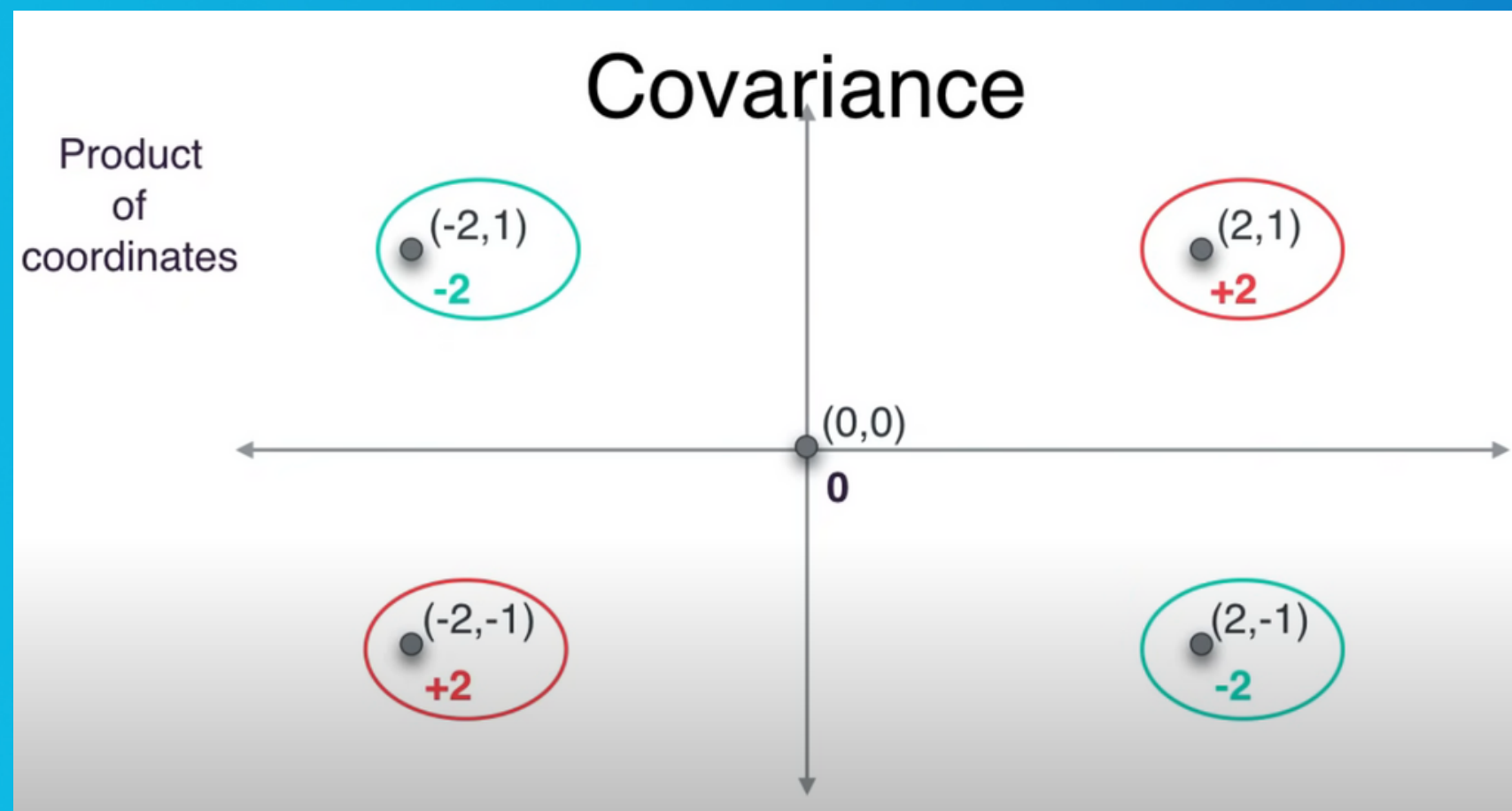wall

Variance
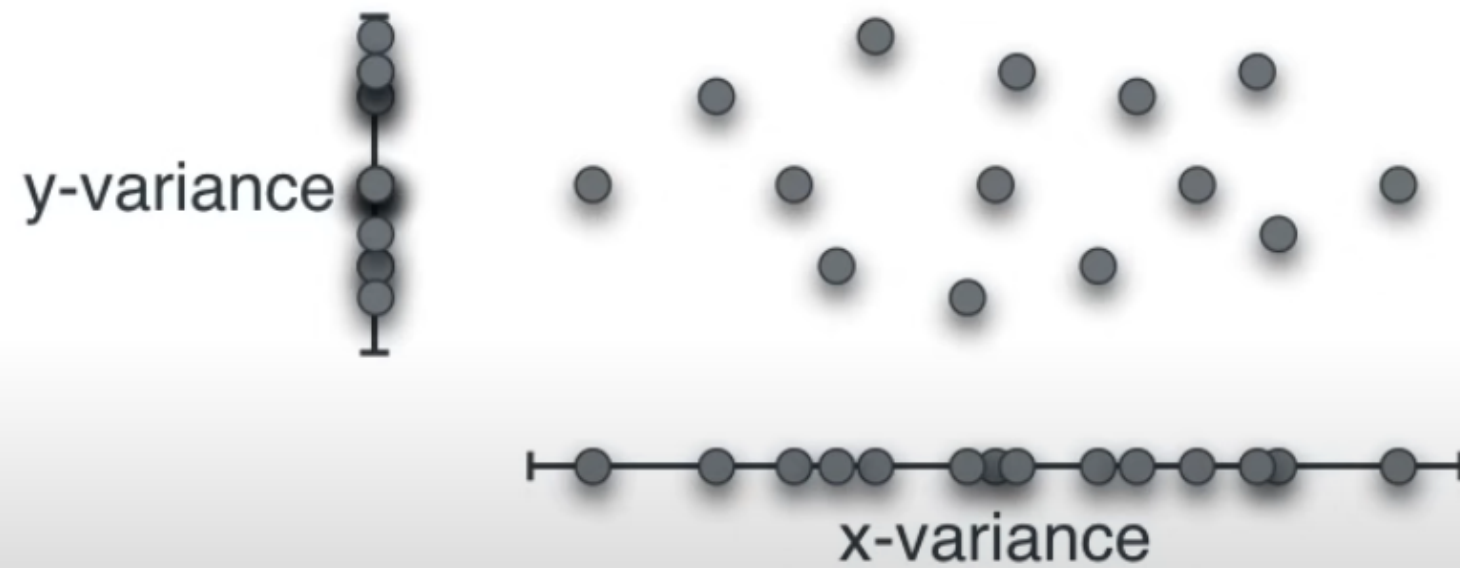
$$\text{Variance} = \frac{1^2+0^2+1^2}{3} = 2/3$$

$$\text{Variance} = \frac{5^2+0^2+5^2}{3} = 50/3$$

MEAN, VARIANCE, COVARIANCE

MEAN, VARIANCE, COVARIANCE

MEAN, VARIANCE, COVARIANCE

COVARIANCE MATRIX

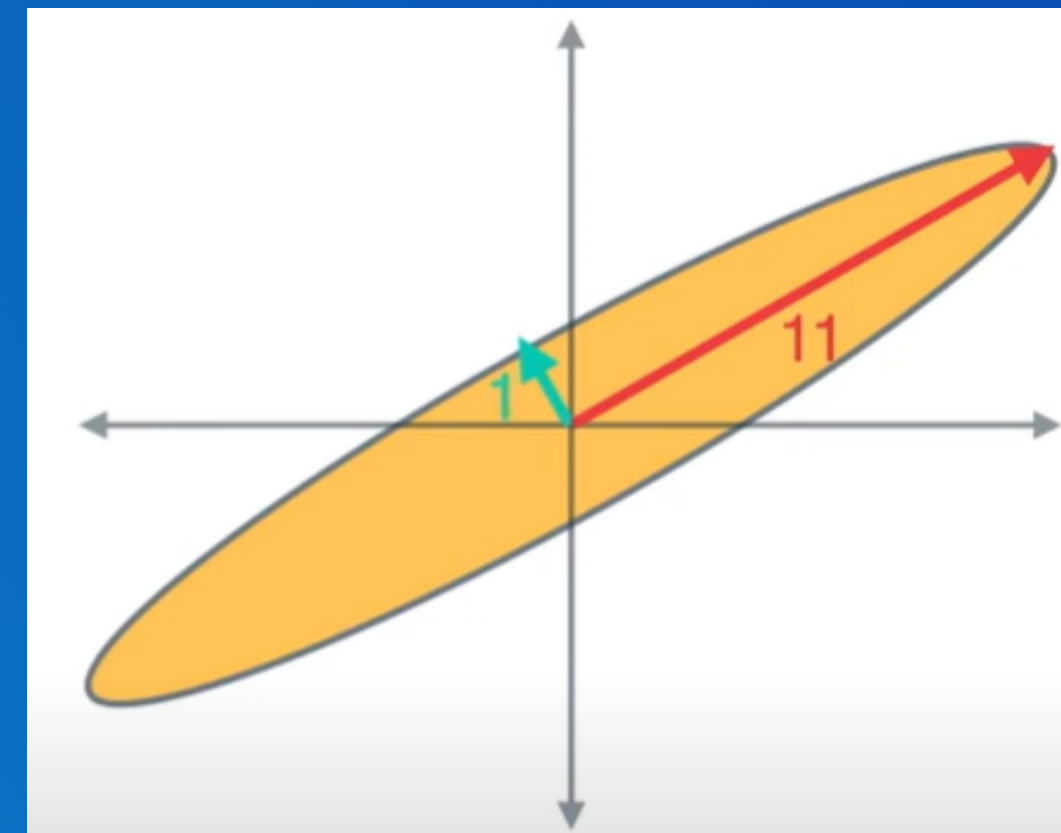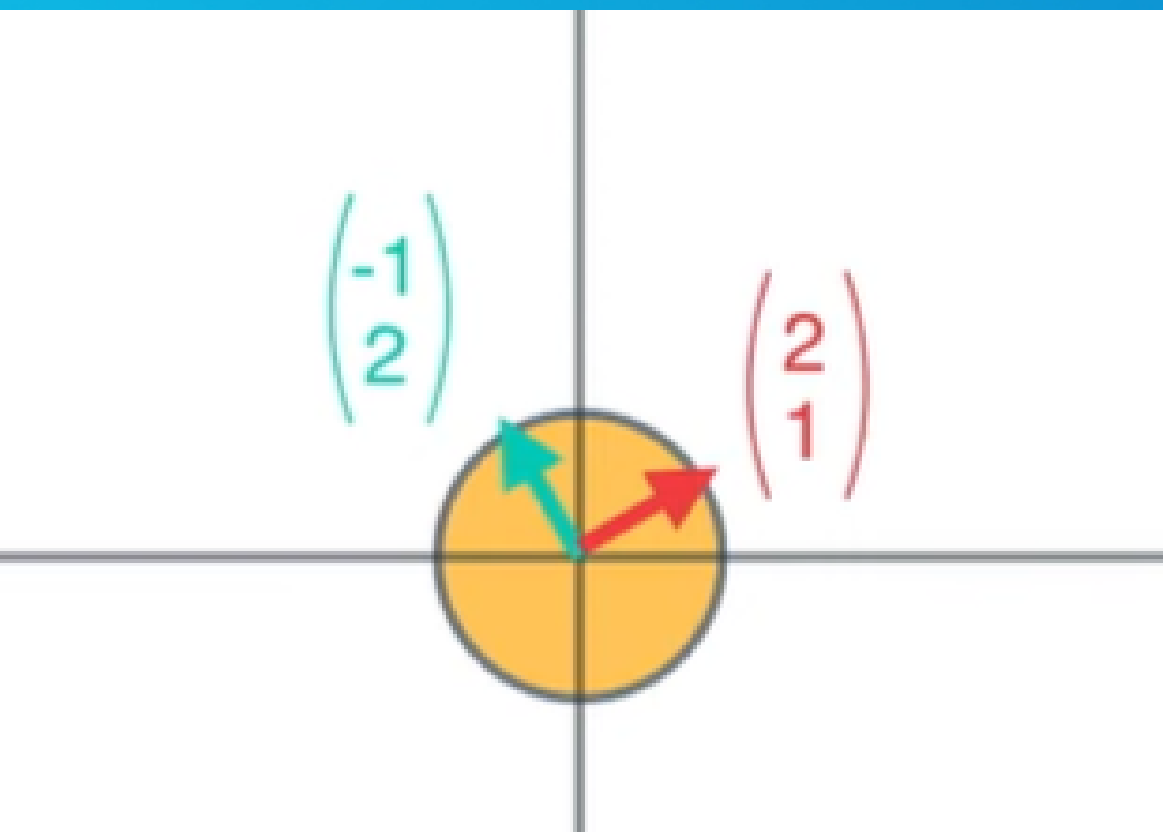

$$\Sigma = \begin{pmatrix} Var(X) & Cov(X,Y) \\ Cov(X,Y) & Var(Y) \end{pmatrix}$$

$$\begin{bmatrix} Cov(x,x) & Cov(x,y) & Cov(x,z) \\ Cov(y,x) & Cov(y,y) & Cov(y,z) \\ Cov(z,x) & Cov(z,y) & Cov(z,z) \end{bmatrix}$$
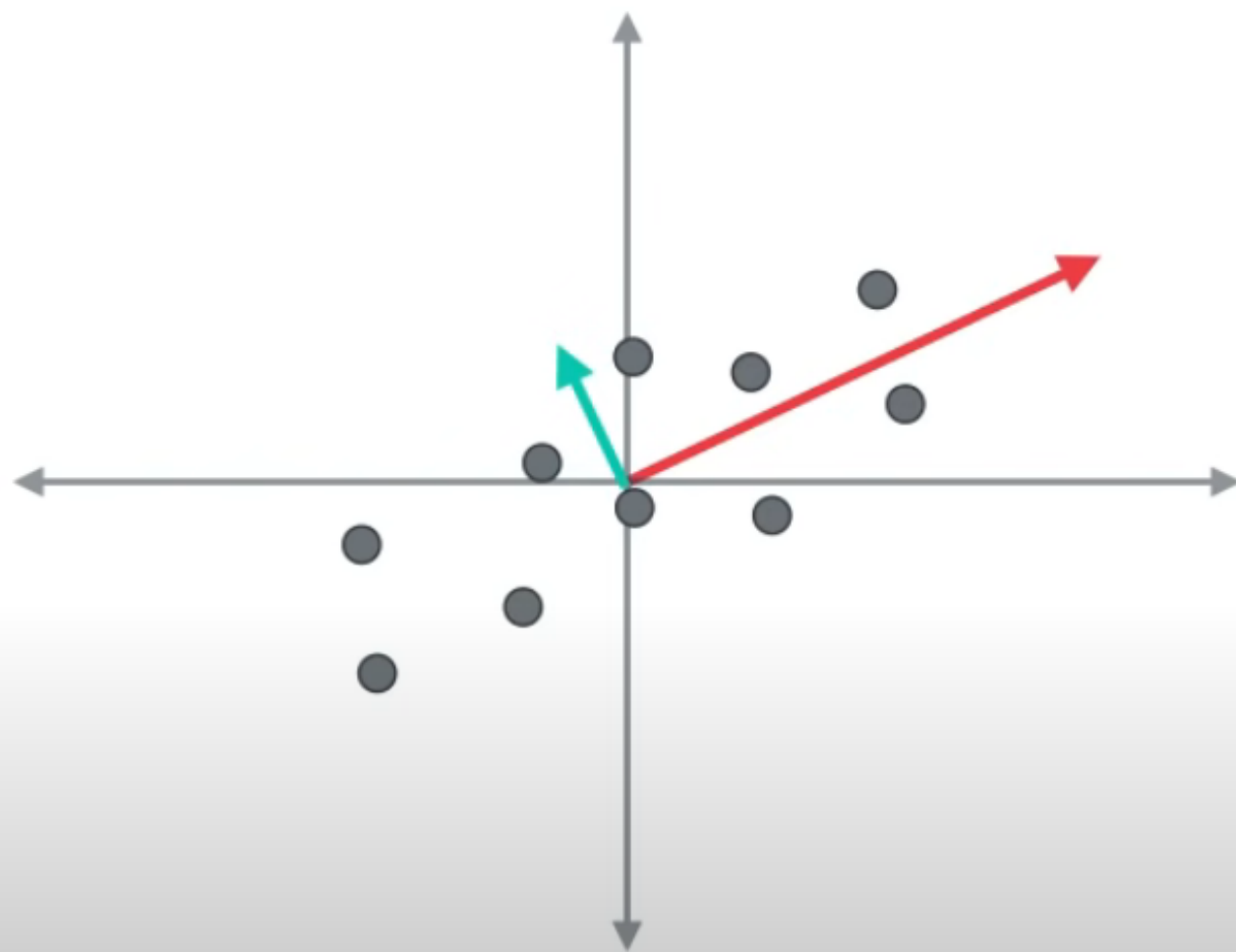
$$\begin{pmatrix} 9 & 4 \\ 4 & 3 \end{pmatrix}$$

EIGENVALUES AND EIGENVECTORS

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