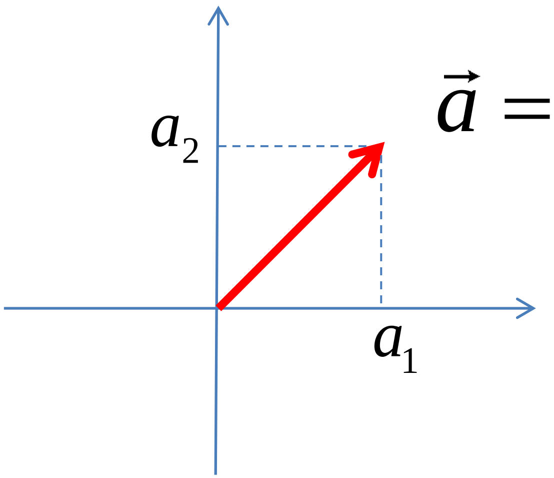
Reminder: matrix inversion

A vector:



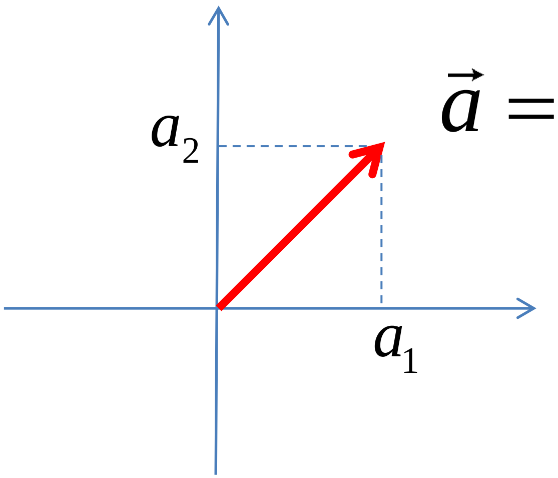
$$\vec{a} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix}$$

A matrix:

$$B = \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}$$

Reminder: matrix inversion

A vector:



$$\vec{a} = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix}$$

A matrix:

$$B = \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}$$

Matrix calculus:

$$\begin{pmatrix} a_1 \\ a_2 \end{pmatrix}$$

$$\vec{c} = B\vec{a} = \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix} \begin{pmatrix} c_1 \\ c_2 \end{pmatrix}$$

$$c_1 = b_{11}a_1 + b_{12}a_2$$

$$c_2 = b_{21}a_1 + b_{22}a_2$$

Reminder: matrix inversion

$$B^{-1}B = BB^{-1} = I \qquad I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\vec{c} = B\vec{a} \qquad B^{-1}\vec{c} = \vec{a}$$

$$c_1 = b_{11}a_1 + b_{12}a_2$$
$$c_2 = b_{21}a_1 + b_{22}a_2$$

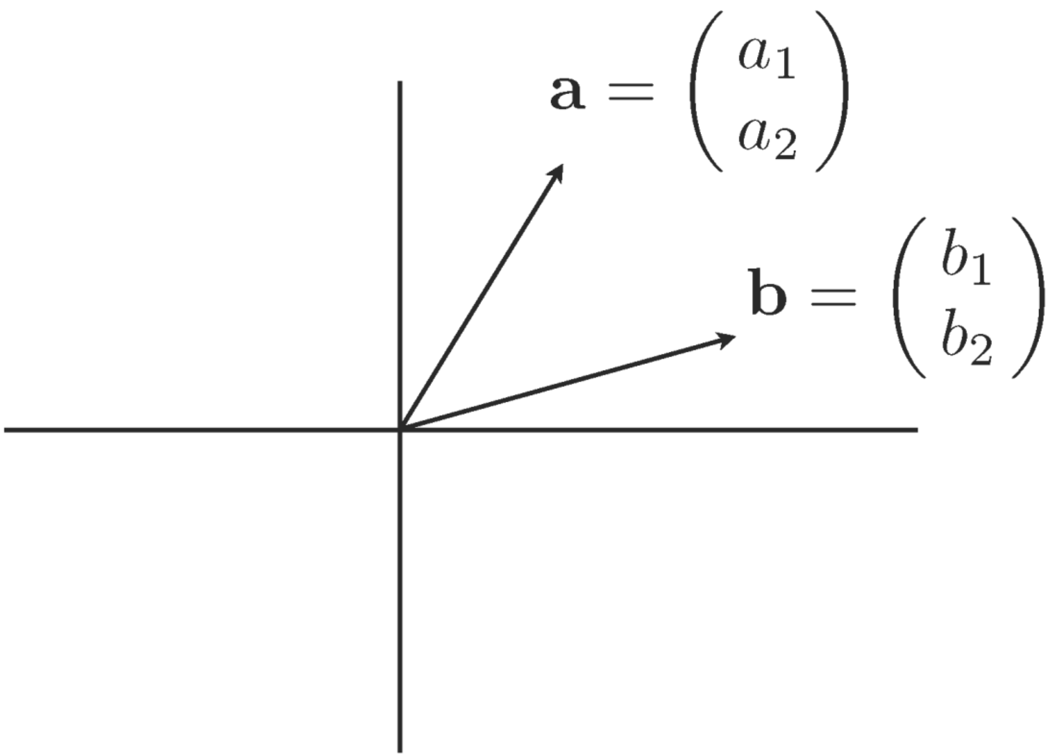
Solve...

B^{-1}_{11} $\quad$ B^{-1}_{12}

$$a_1 = \frac{b_{21}}{b_{21}b_{12} - b_{22}b_{11}}c_1 + \frac{b_{11}}{b_{21}b_{12} - b_{22}b_{11}}c_2$$

....

Reminder: inner product



length

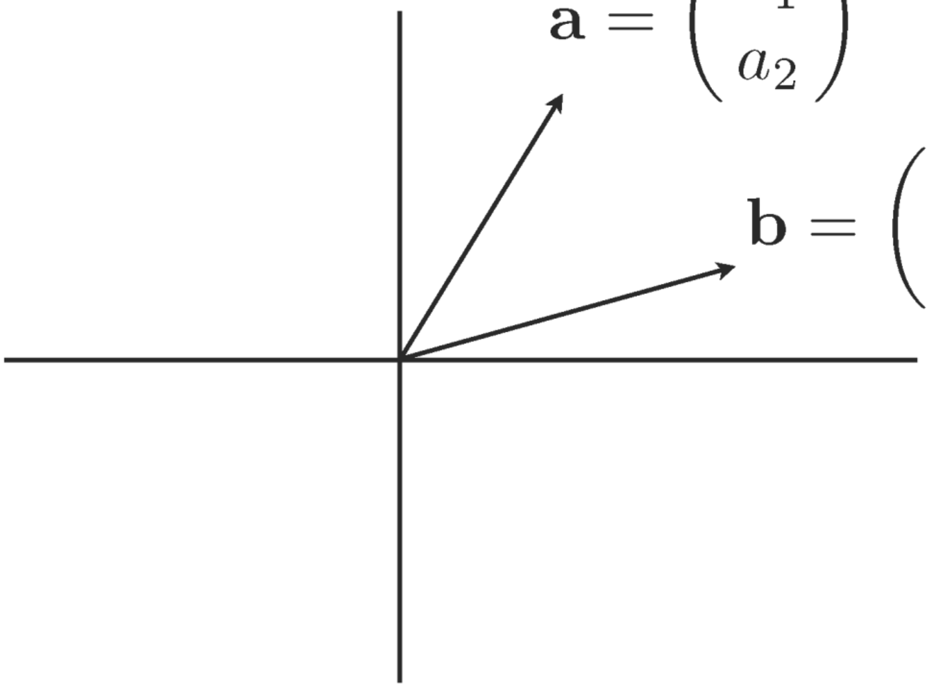
$$||\mathbf{a}|| = \sqrt{a_1^2 + a_2^2}$$

$$||\mathbf{b}|| = \sqrt{b_1^2 + b_2^2}$$

Reminder: inner product

$$\mathbf{a} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix}$$

$$\mathbf{b} = \begin{pmatrix} b_1 \\ b_2 \end{pmatrix}$$



length

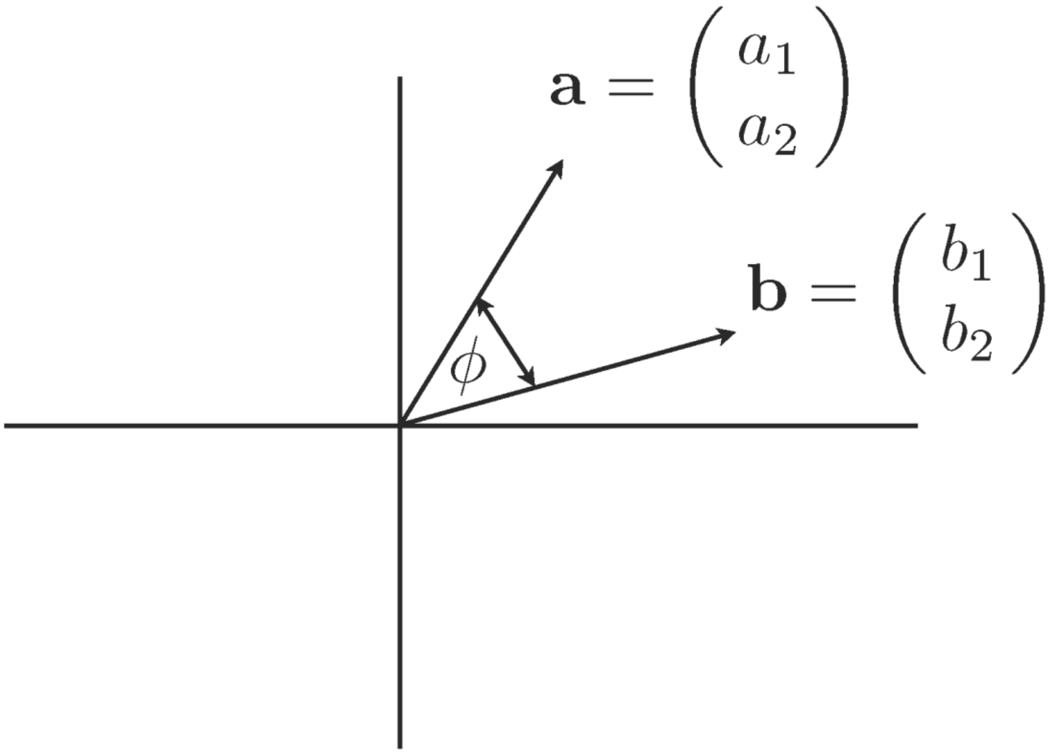
$$||\mathbf{a}|| = \sqrt{a_1^2 + a_2^2}$$

$$||\mathbf{b}|| = \sqrt{b_1^2 + b_2^2}$$

inner product

$$\mathbf{a} \cdot \mathbf{b} = a_1 b_1 + a_2 b_2$$

Reminder: inner product



length

$$||\mathbf{a}|| = \sqrt{a_1^2 + a_2^2}$$

$$||\mathbf{b}|| = \sqrt{b_1^2 + b_2^2}$$

inner product

$$\mathbf{a} \cdot \mathbf{b} = a_1 b_1 + a_2 b_2$$

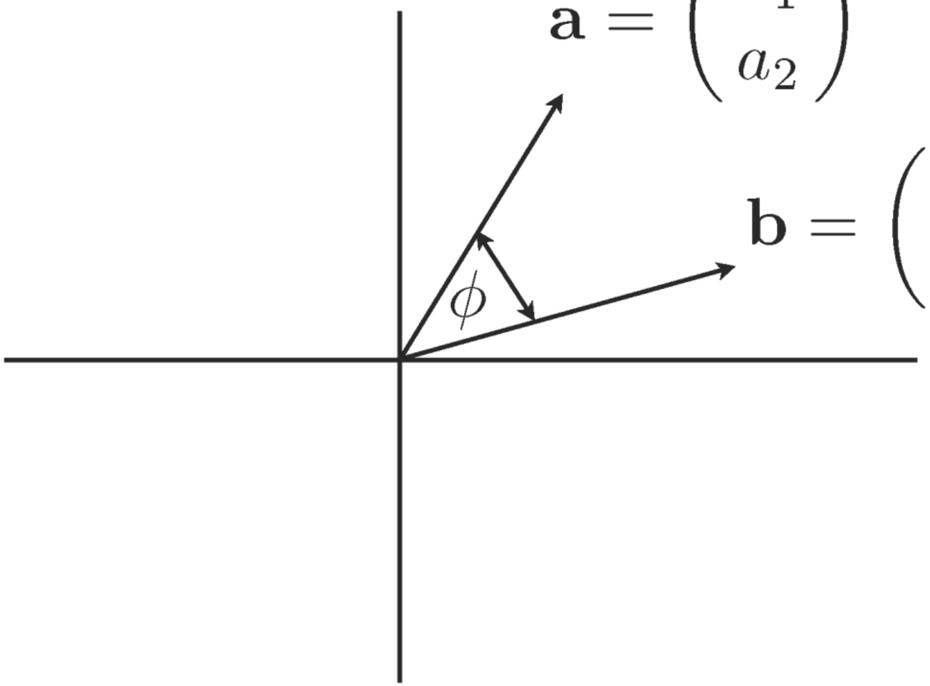
angle

$$\cos(\phi) = \frac{\mathbf{a} \cdot \mathbf{b}}{||\mathbf{a}|| \cdot ||\mathbf{b}||}$$

Reminder: inner product

$$\mathbf{a} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix}$$

$$\mathbf{b} = \begin{pmatrix} b_1 \\ b_2 \end{pmatrix}$$



length

$$||\mathbf{a}|| = \sqrt{a_1^2 + a_2^2}$$

$$||\mathbf{b}|| = \sqrt{b_1^2 + b_2^2}$$

inner product

$$\mathbf{a} \cdot \mathbf{b} = a_1 b_1 + a_2 b_2$$

angle

$$\cos(\phi) = \frac{\mathbf{a} \cdot \mathbf{b}}{||\mathbf{a}|| \cdot ||\mathbf{b}||}$$

$$\phi = 90^\circ \Leftrightarrow \mathbf{a} \cdot \mathbf{b} = 0$$