$$A - \lambda I = \begin{bmatrix} 2-\lambda & 3 \\ 4 & 3-\lambda \end{bmatrix}$$

$$= \begin{bmatrix} (2-\lambda)(3-\lambda) - 12 \end{bmatrix}$$

$$= 6 - 2\lambda - 3\lambda + \lambda^2 - 12$$

$$= \lambda^2 - 5\lambda - 6$$

$$\lambda^2 - 5\lambda - 6 = 0$$

$$\lambda = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a = 1, \quad b = -5, \quad c = -6$$

$$= \frac{+5 \pm \sqrt{25+24}}{2}$$

$a=1$
$b=-5$
$c=-6$

$$= \frac{+5 \pm \sqrt{49}}{2} = \frac{+5 \pm 7}{2}$$

$$\lambda_1 = \frac{12}{2} = 6, \quad \lambda_2 = \frac{-2}{2} = -1$$

$\lambda_1 = 6, \quad \lambda_2 = -1,$

$\lambda_1 > \lambda_2$

$\lambda_1 = 6$//

$$\begin{bmatrix} 2-\lambda & 3 \\ 4 & 3-\lambda \end{bmatrix} \cdot x = 0$$

$$\begin{bmatrix} 2-\lambda & 3 \\ 4 & 3-\lambda \end{bmatrix} \cdot \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = 0$$

→ Row Echelon method

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 8 \\ 4 \end{bmatrix}$$

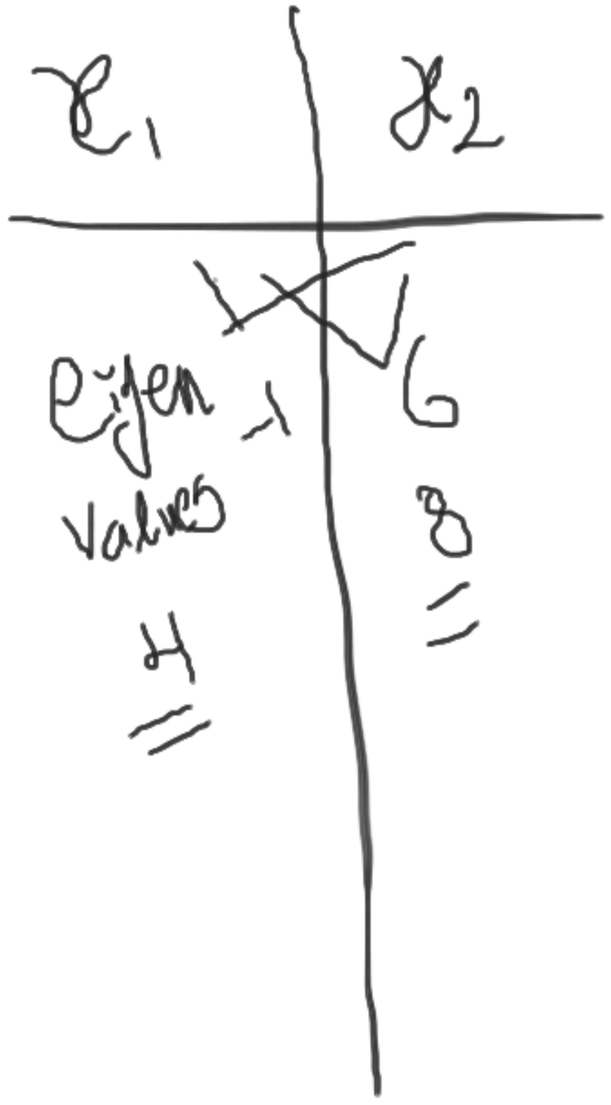
→ Eigen Vector values

$\lambda_1 =$

Eigen Value

Eigen Vector

PC1

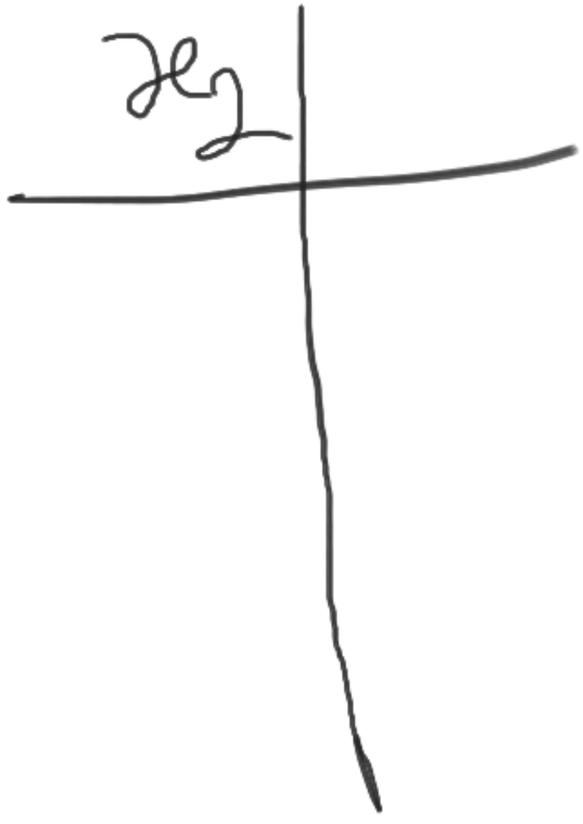


,

$PC_1 = x_2$

PCA(1)

$= x_2$



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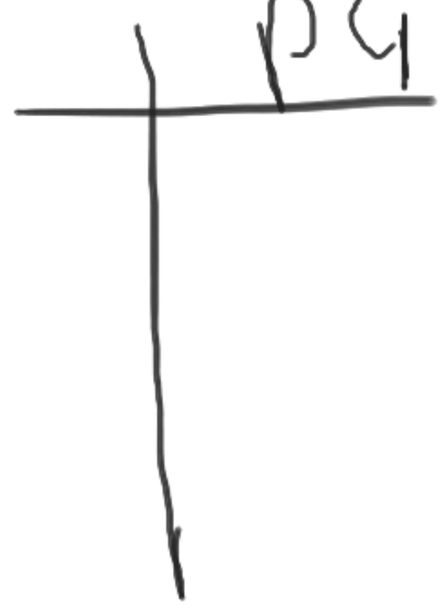
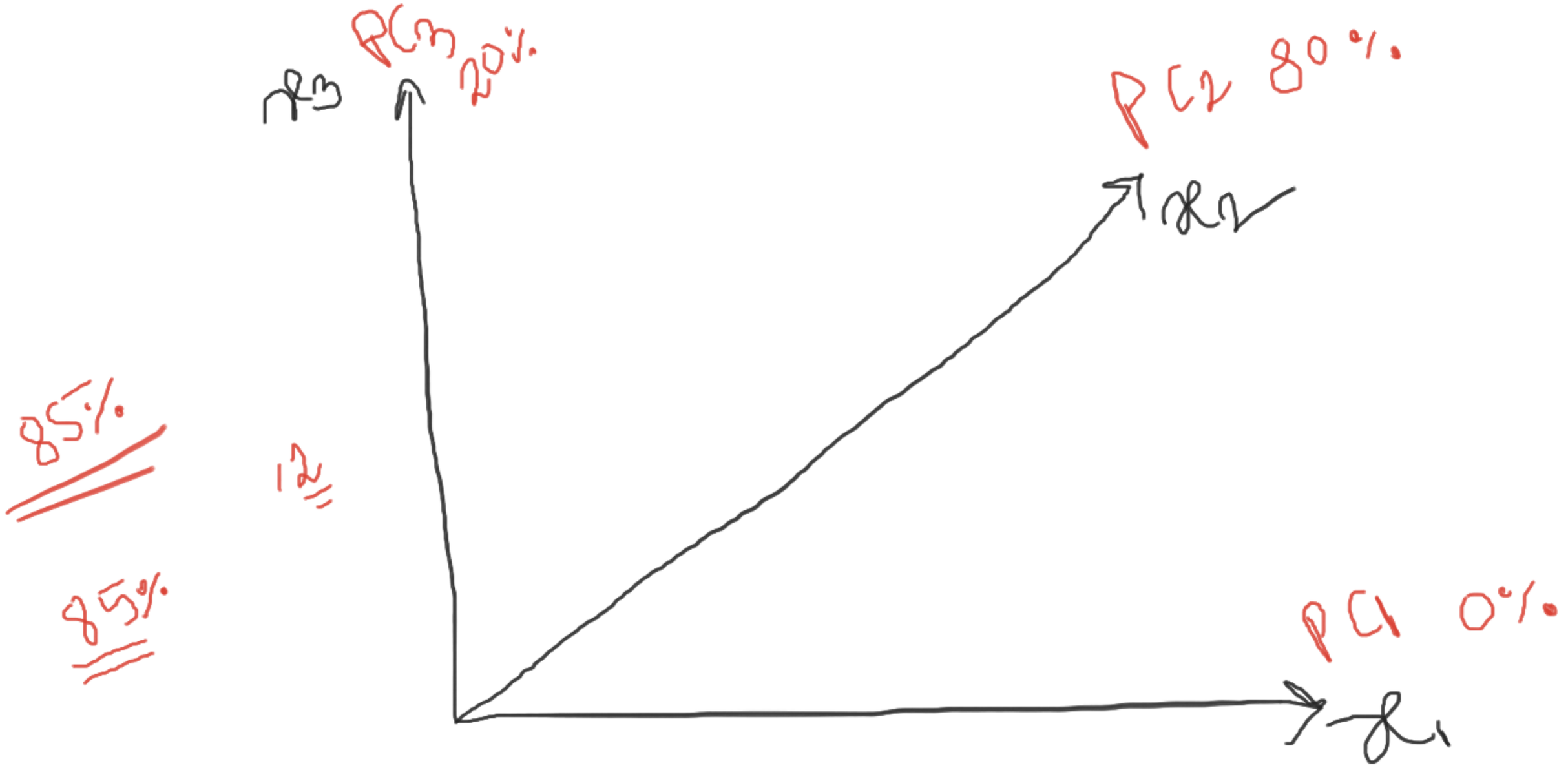
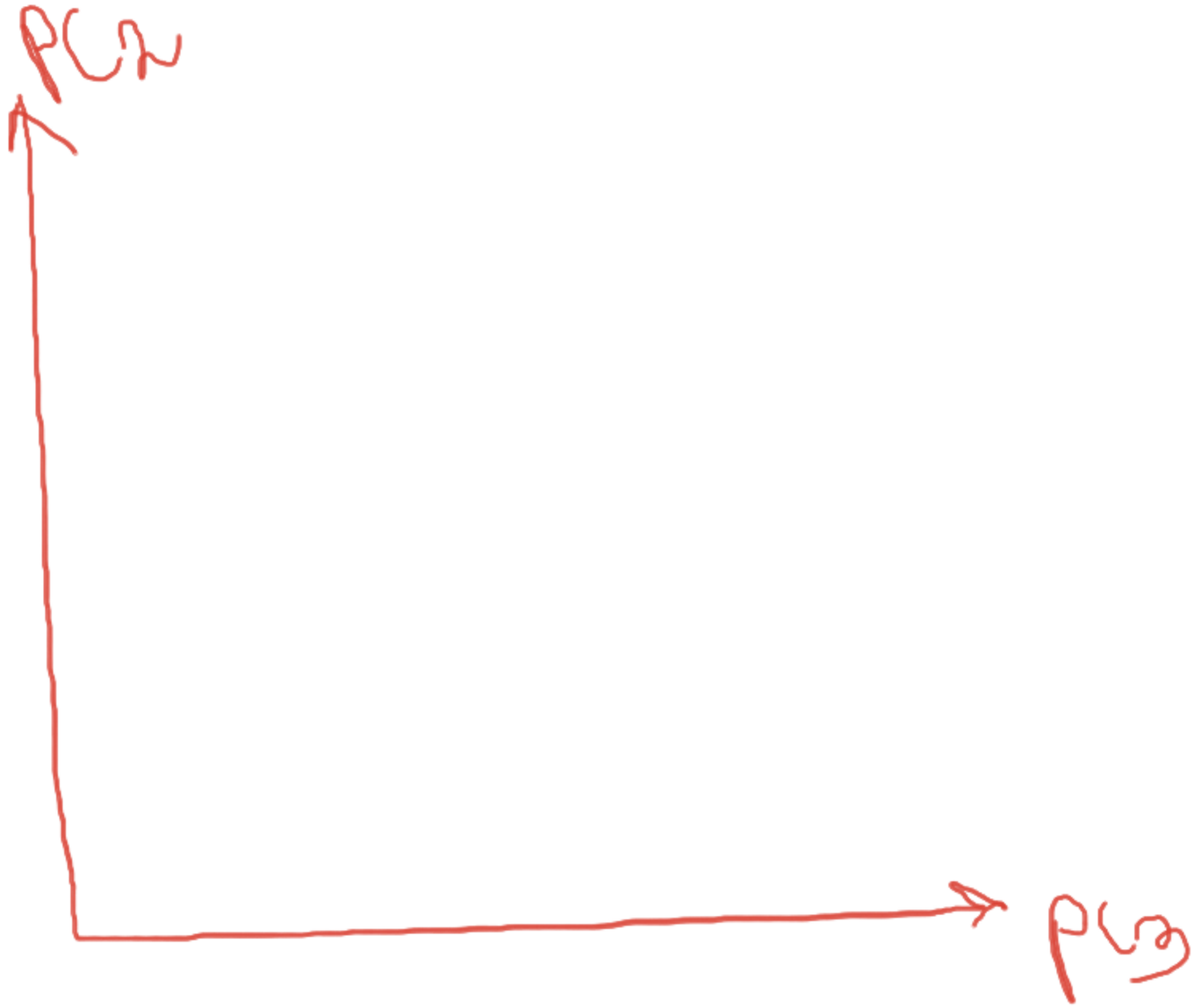
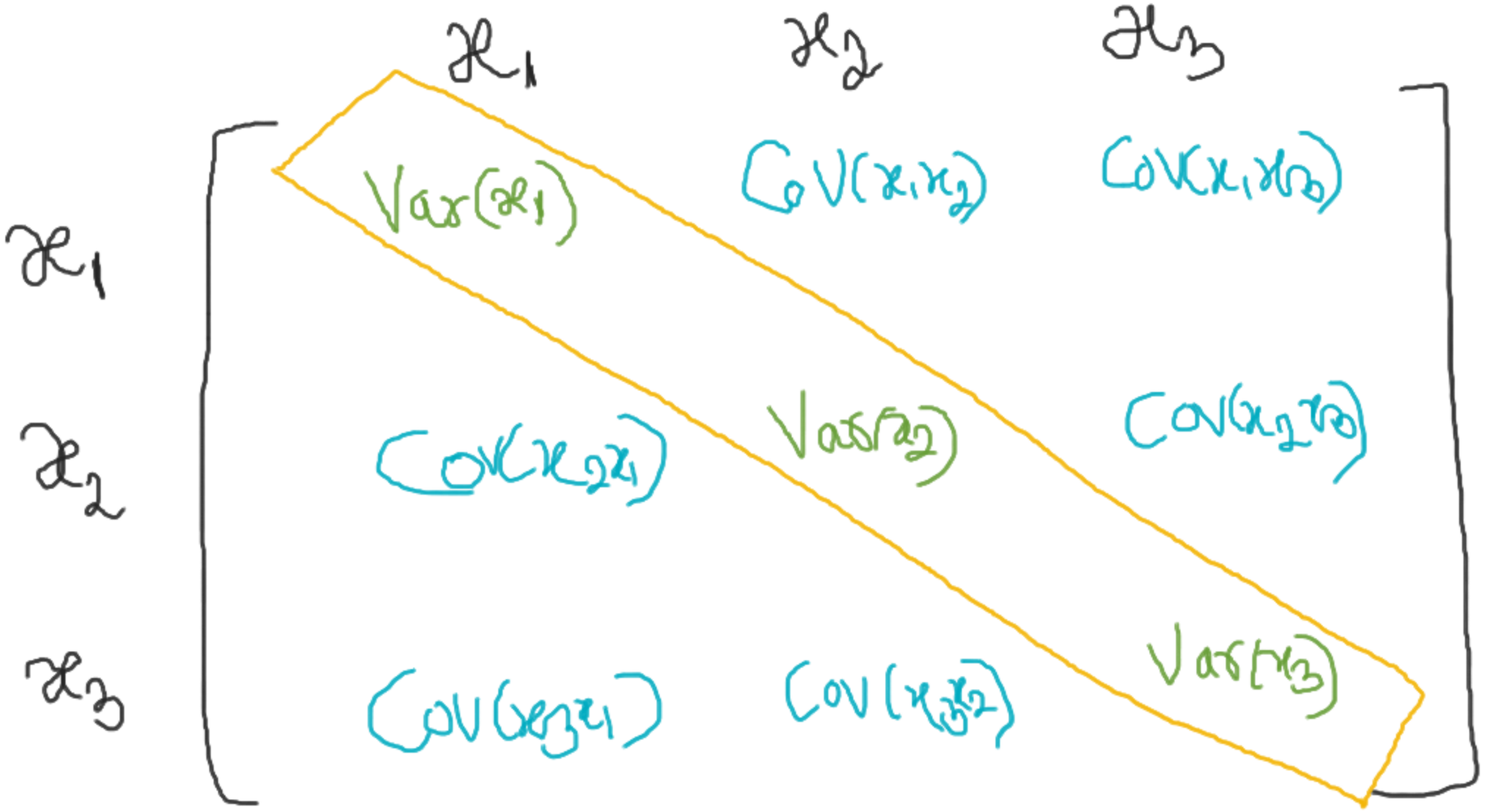


.Ait

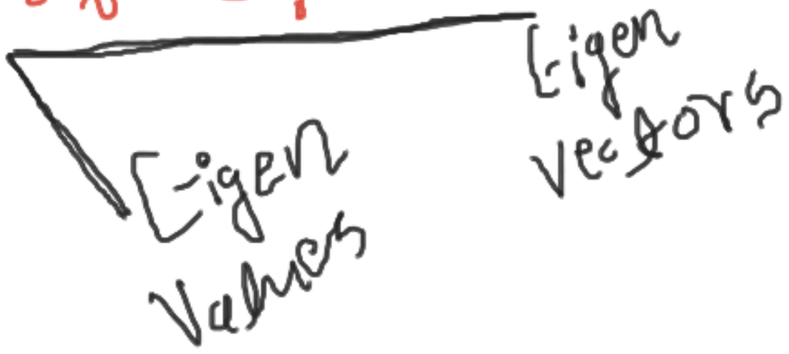

P(3) 20%
P(2 80%
85%
12
85%
P(1 0%

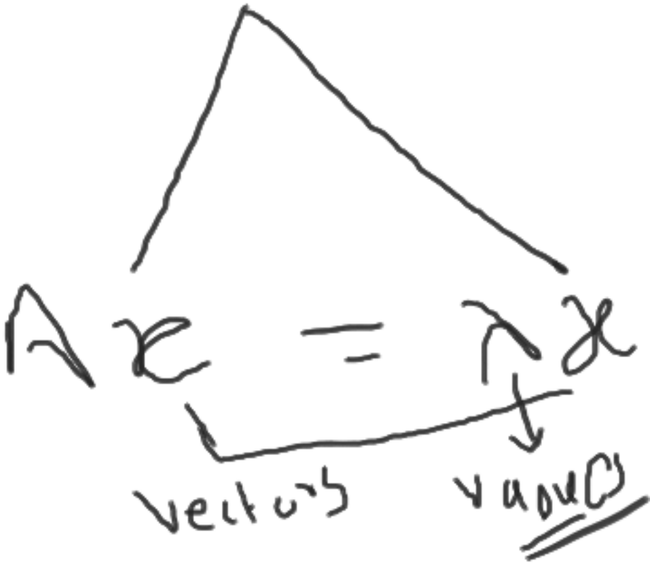


2] Cov matrix ची direction + spread



5] Eigen Decomposition :-





4] Transformation :-

$\vec{P} \cdot \vec{u}$

PC1, (1) 1000 x 3, 3 x 1 = 1 x 1000 = PC1 →

PC2, (11) 1000 x 3, 3 x 1, = 1000 x 1 = PC2 →

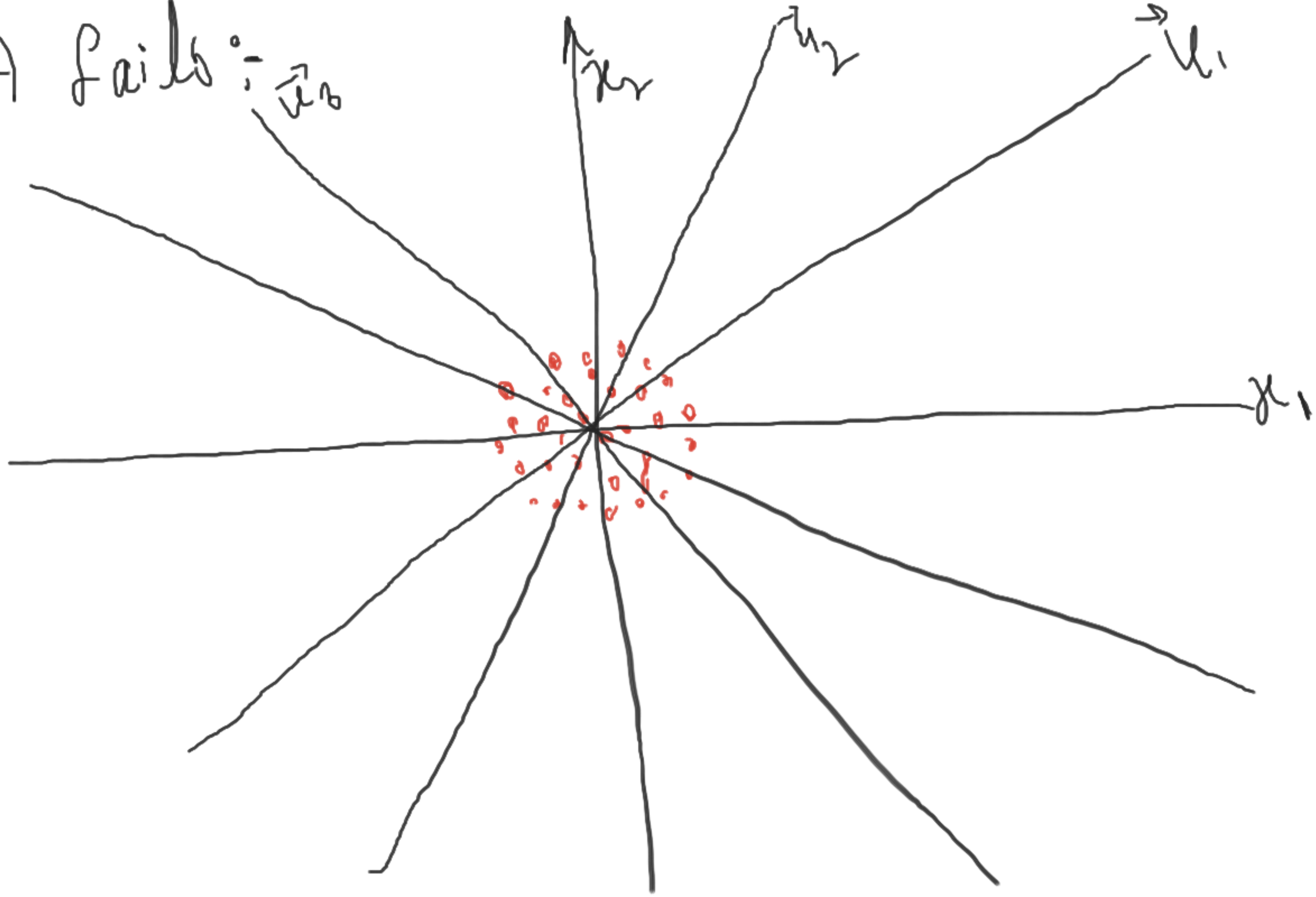
PC3, (111) 1000 x 3, 3 x 1 = 1000 x 1 = PC3 →

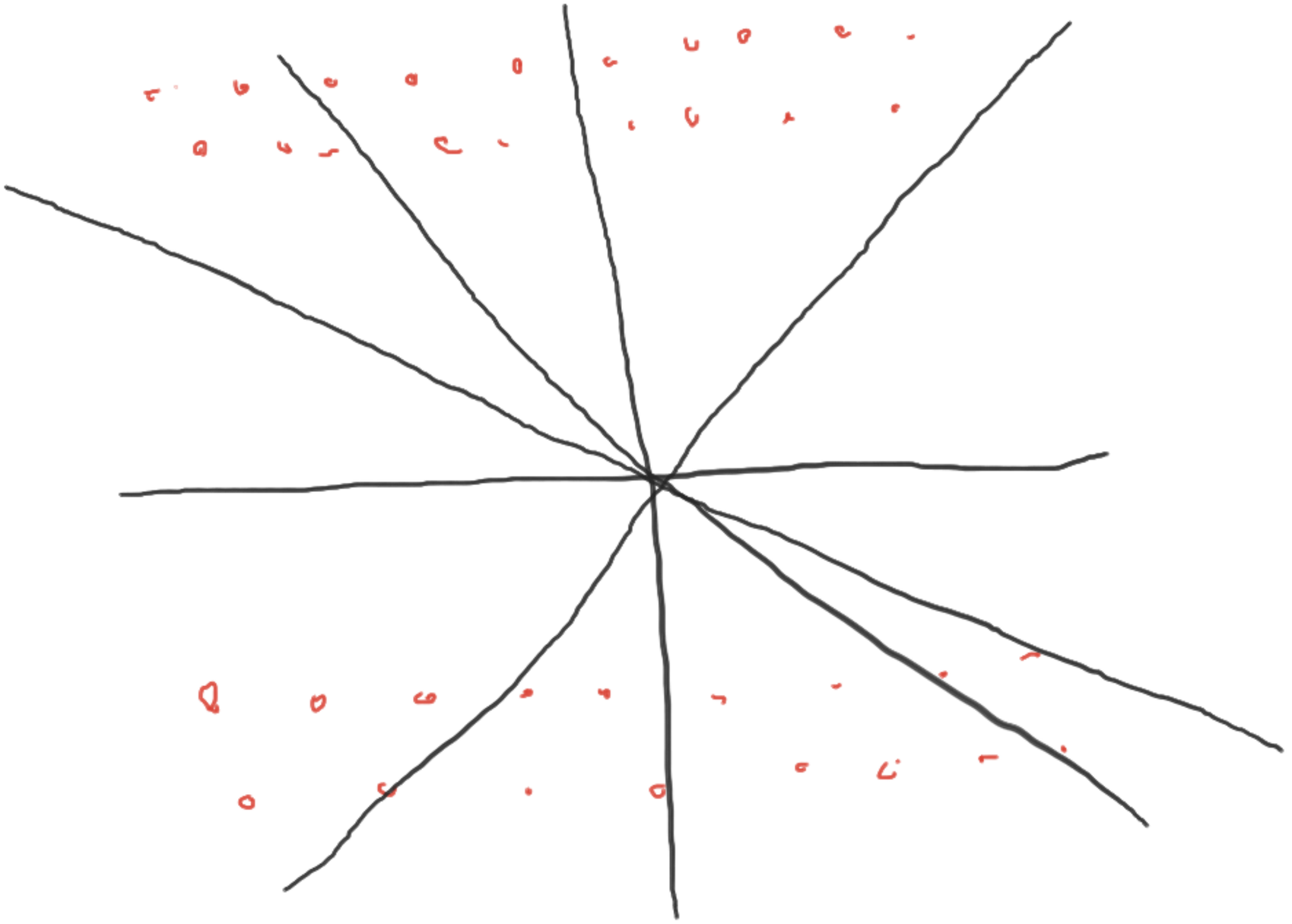
= Principal component
That can get combined on top

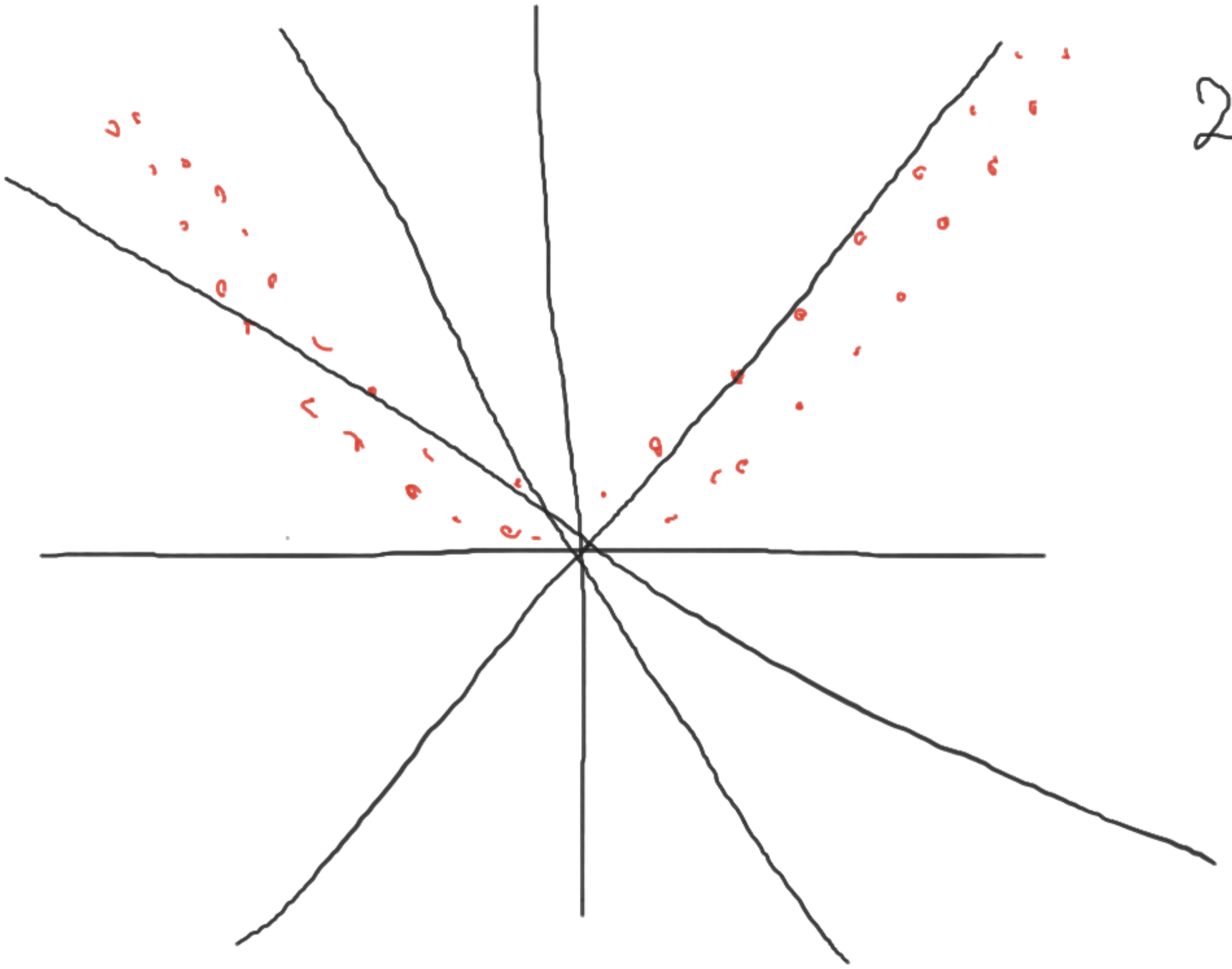
PC_1	PC_2	PC_3	PC_4	PC_{10} ..... PC_{50}	PC_{98}	PC_{99}	PC_{100}
60%	5%	10%	1%	4% 0%	5%	1%	2%	3%

PCA(10)

PCA fails: $\vec{u}_2$







2D

↓

1D