

How does row-equivalence partition the collection of all  $(2 \times 2)$ -matrices?

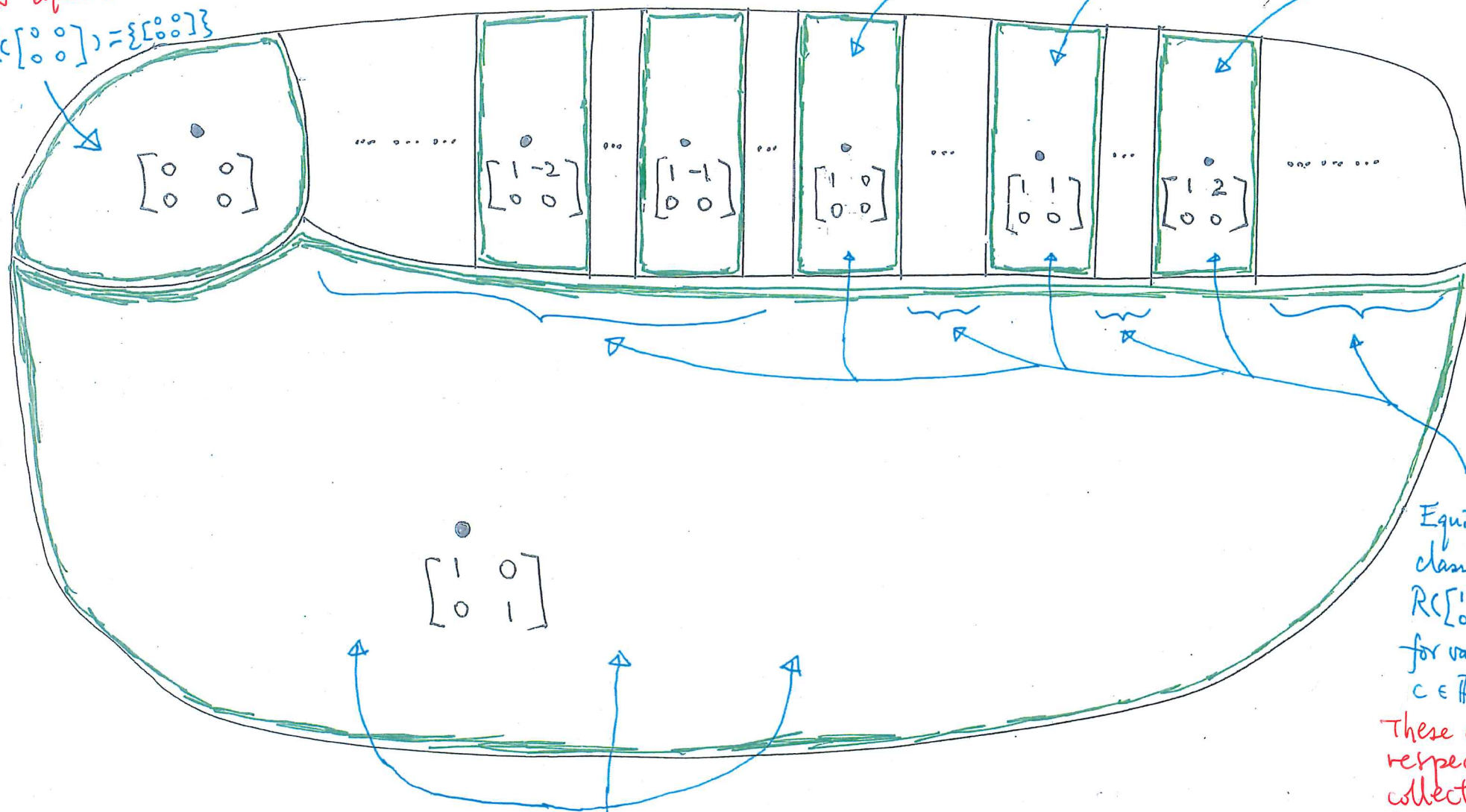
This is the collection of all  $(2 \times 2)$ -matrices which are row-equivalent to  $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ .

$$R(\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}) = \{ \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} \}$$

$$R(\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix})$$

$$R(\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix})$$

$$R(\begin{bmatrix} 1 & 2 \\ 0 & 0 \end{bmatrix})$$



Equivalence classes  $R(\begin{bmatrix} 1 & c \\ 0 & 0 \end{bmatrix})$  for various  $c \in \mathbb{R}$

These are the respective collections, for various values of  $c$ , of  $(2 \times 2)$ -matrices which are row-equivalent to  $\begin{bmatrix} 1 & c \\ 0 & 0 \end{bmatrix}$ .

$$R(\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}) = \{ A \in \text{Mat}_{2 \times 2}(\mathbb{R}) : A \text{ is non-singular.} \}$$

This is the collection of all  $(2 \times 2)$ -matrices which are row-equivalent to  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ .