

1 5月13日

## 1.1 空間内の座標

2次元実ベクトル空間

1次独立な  $n$  個のベクトル

The image shows handwritten notes on a piece of paper, divided into two main sections by a horizontal line. The top section discusses coordinate systems in 2D and 3D vector spaces, while the bottom section discusses linearly independent vectors in  $\mathbb{R}^n$ .

**Top Section:**

- Left side:** Titled "空間内の座標" (Coordinates in space). It discusses the "2次元実ベクトル空間" (2D real vector space) and shows the equation 
$$\begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = c_1 \begin{pmatrix} 3 \\ 2 \end{pmatrix} + c_2 \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$
- Right side:** Titled "3次元実ベクトル空間" (3D real vector space). It shows the equation 
$$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = c_1 \begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix} + c_2 \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + c_3 \begin{pmatrix} -1 \\ 2 \\ 1 \end{pmatrix}$$
 followed by ".....".

**Bottom Section:**

- Left side:** Discusses "1次独立な  $n$  個のベクトル" (Linearly independent  $n$  vectors). It states that for a set of vectors  $\{a_1, a_2, \dots, a_n\}$ , any vector  $x \in \mathbb{R}^n$  can be expressed as 
$$x = c_1 a_1 + c_2 a_2 + \dots + c_n a_n$$
- Right side:** States "の形は  $\vec{r} = \vec{r}_0 + \vec{v}$  の形" (The form is  $\vec{r} = \vec{r}_0 + \vec{v}$  form) and "表すことができる" (can be expressed).