No.

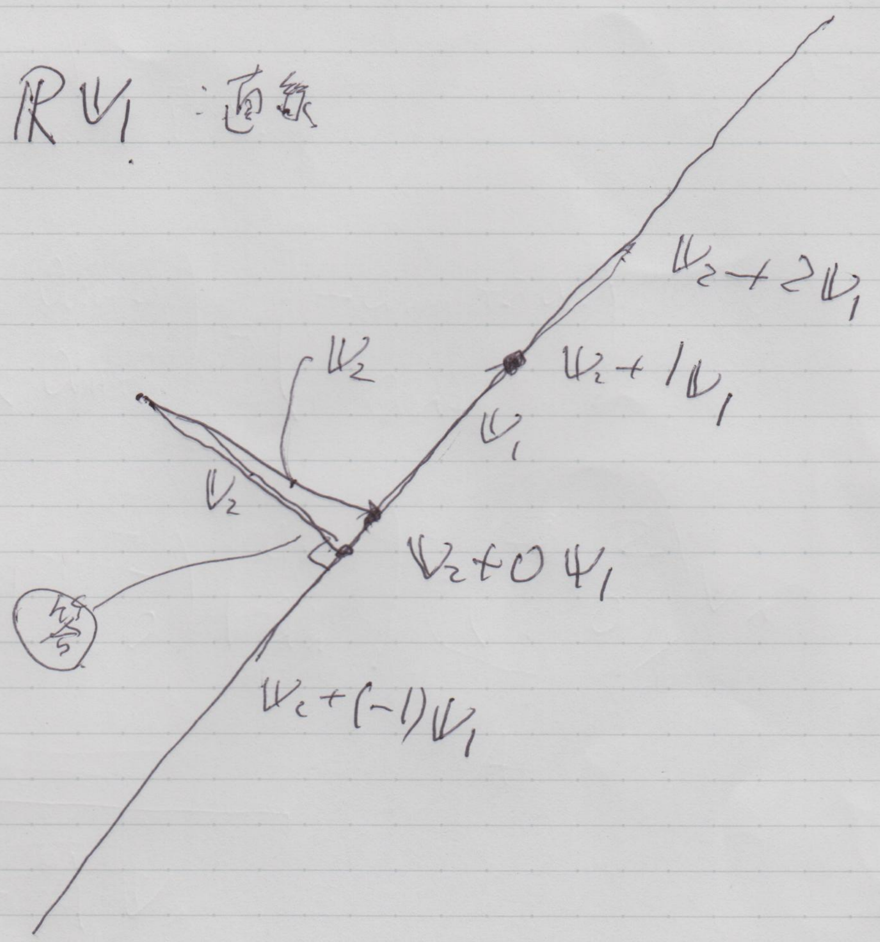
Date

$\cancel{v_3 = \boxed{\mathbb{R}v + \mathbb{R}v_2}}$ とおく.

集合.　　$\underline{\mathbb{R}}$: 実数全体の集合.

(1)

$\mathbb{v}_2 + \mathbb{R}\mathbb{v}_1$: 直線



$$a_{n+2} = -a_{n+1} + 2a_n.$$

$\mathbf{v}_n = \begin{pmatrix} a_{n+1} \\ a_n \end{pmatrix}$ とおく.

$$\mathbf{v}_{n+1} = \begin{pmatrix} a_{n+2} \\ a_{n+1} \end{pmatrix} = \begin{pmatrix} -a_{n+1} + 2a_n \\ a_{n+1} \end{pmatrix}$$

$$= \begin{pmatrix} -1 & 2 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} a_{n+1} \\ a_n \end{pmatrix} = \underbrace{\begin{pmatrix} -1 & 2 \\ 1 & 0 \end{pmatrix}}_{= A} \mathbf{v}_n$$

$$\boxed{\mathbf{v}_{n+1} = A\mathbf{v}_n}$$

$$\boxed{\mathbf{v}_n = A^n \mathbf{v}_0}$$

A^n をどうやって計算するか?

$P^{-1}AP = \begin{pmatrix} \lambda & 0 \\ 0 & \mu \end{pmatrix}$ 対角化.

$$\underbrace{(P^{-1}AP)\cdots(P^{-1}AP)}_{n\text{個}} = P^{-1}A^nP$$

$$\parallel$$

$$\begin{pmatrix} \lambda^n & 0 \\ 0 & \mu^n \end{pmatrix}$$

$$\rightarrow A^n = P\begin{pmatrix} \lambda^n & 0 \\ 0 & \mu^n \end{pmatrix}P^{-1}.$$

※ $a_{n+2} = -a_{n+1} + 2a_n$

をとく. 等比数列の解(初項 $= 1$)
$\underset{a_0}{\text{初項}}$

$a_n = r^n$ が ※ の解

$\Leftrightarrow r^{n+2} = -r^{n+1} + 2r^n \quad (\forall n)$

$\Leftrightarrow r^2 = -r + 2$

$\Leftrightarrow r^2 + r - 2 = 0$

$\Leftrightarrow \cancel{(r-2)(r-1}$

$\cancel{(r+2)(r-1)}$

$(r-1)(r+2) = 0$

$\Leftrightarrow r = 1 \text{ or } -2$

$\boxed{a_n = 1 \quad (\forall n)}$

$\boxed{a_n = (-2)^n \quad (\forall n)}$

$\boxed{a_n = c \cdot 1 + d \cdot (-2)^n \text{ も ※ の解}}$

$\mathbb{V}_n = \begin{pmatrix} a_{n+1} \\ a_n \end{pmatrix}$

とおく

↓

$\mathbb{V}_n$ の漸化式

$$\begin{pmatrix} \lambda_1 \cdots \lambda_1 & & & O \\ & \lambda_2 \cdots \lambda_2 & & \\ & & \ddots & \\ O & & & \end{pmatrix}$$

$$\begin{pmatrix} \lambda_1 & & * \\ & \ddots & \\ 0 & & \lambda_1 \end{pmatrix} = \lambda_1 1_n + \underbrace{\begin{pmatrix} 0 & & * \\ & \ddots & \\ 0 & & 0 \end{pmatrix}}_{\text{巾零}}$$