

正規直交化法 問題 1

グラム・シュミットの正規直交化法を用いて、次の基底から正規直交基底を作れ.

$$(1) a_1 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, a_2 = \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix}, a_3 = \begin{pmatrix} -1 \\ 1 \\ 2 \end{pmatrix}$$

$$(2) a_1 = \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix}, a_2 = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, a_3 = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$$

$$(3) a_1 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, a_2 = \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}, a_3 = \begin{pmatrix} 1 \\ -2 \\ -1 \end{pmatrix}$$

$$(4) a_1 = \begin{pmatrix} -1 \\ 2 \\ 2 \end{pmatrix}, a_2 = \begin{pmatrix} 0 \\ 1 \\ 2 \end{pmatrix}, a_3 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

$$(5) a_1 = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}, a_2 = \begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix}, a_3 = \begin{pmatrix} 3 \\ 4 \\ 1 \end{pmatrix}$$

$$(6) a_1 = \begin{pmatrix} 1 \\ -1 \\ 1 \\ -1 \end{pmatrix}, a_2 = \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \end{pmatrix}, a_3 = \begin{pmatrix} 0 \\ 0 \\ 1 \\ 1 \end{pmatrix}, a_4 = \begin{pmatrix} 0 \\ 1 \\ 1 \\ 0 \end{pmatrix}$$

$$(7) a_1 = \begin{pmatrix} 1 \\ 3 \\ 0 \\ 0 \end{pmatrix}, a_2 = \begin{pmatrix} -1 \\ 1 \\ 0 \\ 0 \end{pmatrix}, a_3 = \begin{pmatrix} 0 \\ 0 \\ 1 \\ 1 \end{pmatrix}, a_4 = \begin{pmatrix} 0 \\ 0 \\ 3 \\ 4 \end{pmatrix}$$

$$(8) a_1 = \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}, a_2 = \begin{pmatrix} 2 \\ 1 \\ 2 \\ 1 \end{pmatrix}, a_3 = \begin{pmatrix} 0 \\ -2 \\ 1 \\ -1 \end{pmatrix}, a_4 = \begin{pmatrix} 1 \\ -3 \\ 1 \\ -1 \end{pmatrix}$$

$$(9) a_1 = \begin{pmatrix} 1 \\ 1 \\ -1 \\ -1 \end{pmatrix}, a_2 = \begin{pmatrix} 1 \\ 1 \\ 1 \\ -1 \end{pmatrix}, a_3 = \begin{pmatrix} 1 \\ -1 \\ 1 \\ 1 \end{pmatrix}, a_4 = \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}$$