代幾 I 計算演習 [問題] (2007/07/12)

問. 次の空間ベクトル v への射影子行列を求めなさい

Q.1

$$\mathrm{v} = \begin{pmatrix} -3 \\ 4 \\ 2 \end{pmatrix}$$

Q.2

$$\mathrm{v} = \begin{pmatrix} 3 \\ -3 \\ -1 \end{pmatrix}$$

Q.3

$$\mathrm{v} = \begin{pmatrix} 1 \\ -6 \\ 3 \end{pmatrix}$$

Q.4

$$\mathrm{v} = \begin{pmatrix} -3 \\ 5 \\ -2 \end{pmatrix}$$

Q.5

$$\mathrm{v} = \begin{pmatrix} 6 \\ -4 \\ 0 \end{pmatrix}$$

Q.6

$$\mathrm{v} = \begin{pmatrix} -2 \\ -1 \\ -3 \end{pmatrix}$$

Q.7

$$\mathrm{v} = \begin{pmatrix} -1 \\ -5 \\ -4 \end{pmatrix}$$

Q.8

$$\mathrm{v} = \begin{pmatrix} 7 \\ -3 \\ 0 \end{pmatrix}$$

Q.9

$$\mathrm{v} = \begin{pmatrix} 0 \\ 6 \\ 4 \end{pmatrix}$$

Q.10

$$\mathrm{v} = \begin{pmatrix} 1 \\ -2 \\ 6 \end{pmatrix}$$

Q.11

$$\mathrm{v} = \begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix}$$

Q.12

$$\mathrm{v} = \begin{pmatrix} 3 \\ -6 \\ 4 \end{pmatrix}$$

Q.13

$$\mathrm{v} = \begin{pmatrix} 2 \\ 0 \\ -6 \end{pmatrix}$$

代幾 I 計算演習 [解答] (2007/07/12)

A.1

$$\begin{pmatrix} \frac{9}{29} & -\frac{12}{29} & -\frac{6}{29} \\ -\frac{12}{29} & \frac{16}{29} & \frac{8}{29} \\ -\frac{6}{29} & \frac{8}{29} & \frac{4}{29} \end{pmatrix}$$

A.2

$$\begin{pmatrix} \frac{9}{19} & -\frac{9}{19} & -\frac{3}{19} \\ -\frac{9}{19} & \frac{9}{19} & \frac{3}{19} \\ -\frac{3}{19} & \frac{3}{19} & \frac{1}{19} \end{pmatrix}$$

A.3

$$\begin{pmatrix} \frac{1}{46} & -\frac{3}{23} & \frac{3}{46} \\ -\frac{3}{23} & \frac{18}{23} & -\frac{9}{23} \\ \frac{3}{46} & -\frac{9}{23} & \frac{9}{46} \end{pmatrix}$$

A.4

$$\begin{pmatrix} \frac{9}{38} & -\frac{15}{38} & \frac{3}{19} \\ -\frac{15}{38} & \frac{25}{38} & -\frac{5}{19} \\ \frac{3}{19} & -\frac{5}{19} & \frac{2}{19} \end{pmatrix}$$

A.5

$$\begin{pmatrix} \frac{9}{13} & -\frac{6}{13} & 0 \\ -\frac{6}{13} & \frac{4}{13} & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

A.6

$$\begin{pmatrix} \frac{2}{7} & \frac{1}{7} & \frac{3}{7} \\ \frac{1}{7} & \frac{1}{14} & \frac{3}{14} \\ \frac{3}{7} & \frac{3}{14} & \frac{9}{14} \end{pmatrix}$$

A.7

$$\begin{pmatrix} \frac{1}{42} & \frac{5}{42} & \frac{2}{21} \\ \frac{5}{42} & \frac{25}{42} & \frac{10}{21} \\ \frac{2}{21} & \frac{10}{21} & \frac{8}{21} \end{pmatrix}$$

A.8

$$\begin{pmatrix} \frac{49}{58} & -\frac{21}{58} & 0 \\ -\frac{21}{58} & \frac{9}{58} & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

A.9

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & \frac{9}{13} & \frac{6}{13} \\ 0 & \frac{6}{13} & \frac{4}{13} \end{pmatrix}$$

A.10

$$\begin{pmatrix} \frac{1}{41} & -\frac{2}{41} & \frac{6}{41} \\ -\frac{2}{41} & \frac{4}{41} & -\frac{12}{41} \\ \frac{6}{41} & -\frac{12}{41} & \frac{36}{41} \end{pmatrix}$$

A.11

$$\begin{pmatrix} \frac{9}{10} & \frac{3}{10} & 0 \\ \frac{3}{10} & \frac{1}{10} & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

A.12

$$\begin{pmatrix} \frac{9}{61} & -\frac{18}{61} & \frac{12}{61} \\ -\frac{18}{61} & \frac{36}{61} & -\frac{24}{61} \\ \frac{12}{61} & -\frac{24}{61} & \frac{16}{61} \end{pmatrix}$$

A.13

$$\begin{pmatrix} \frac{1}{10} & 0 & -\frac{3}{10} \\ 0 & 0 & 0 \\ -\frac{3}{10} & 0 & \frac{9}{10} \end{pmatrix}$$