代数学幾何学 (A/B) 計算演習 [問題] (2009/05/21)

問. 次の平面への射影子行列を求めなさい

Q.1

$3x - 6y - 5z = 39$

Q.2

$6x - 2y - 5z = 25$

Q.3

$x + y + 6z = 36$

Q.4

$5x - 7y - 3z = -24$

Q.5

$x + 2y + 3z = 11$

Q.6

$3x + y - z = 16$

Q.7

$x + 2y + 5z = 23$

Q.8

$5x - 4y - 6z = -61$

Q.9

$5x - 6y - 5z = 58$

Q.10

$4x + 7y - 3z = -17$

Q.11

$6x - z = -10$

Q.12

$x + 5y = -26$

Q.13

$6x - 3y - 4z = -11$

Q.14

$x - 3z = -21$

Q.15

$4x - 2y - z = -16$

Q.16

$6x - 5y + 6z = 25$

Q.17

$6x + 5y + 4z = 46$

Q.18

$2x - 6y - 5z = -36$

Q.19

$7x - y - 4z = 16$

Q.20

$5x - y - z = 8$

Q.21

$2y + 3z = -17$

代数学幾何学 (A/B) 計算演習 [解答] (2009/05/21)

A.1

$$\begin{pmatrix} \frac{61}{70} & \frac{9}{35} & \frac{3}{14} \\ \frac{9}{35} & \frac{17}{35} & -\frac{3}{7} \\ \frac{3}{14} & -\frac{3}{7} & \frac{9}{14} \end{pmatrix}$$

A.2

$$\begin{pmatrix} \frac{29}{65} & \frac{12}{65} & \frac{6}{13} \\ \frac{12}{65} & \frac{61}{65} & -\frac{2}{13} \\ \frac{6}{13} & -\frac{2}{13} & \frac{8}{13} \end{pmatrix}$$

A.3

$$\begin{pmatrix} \frac{37}{38} & -\frac{1}{38} & -\frac{3}{19} \\ -\frac{1}{38} & \frac{37}{38} & -\frac{3}{19} \\ -\frac{3}{19} & -\frac{3}{19} & \frac{1}{19} \end{pmatrix}$$

A.4

$$\begin{pmatrix} \frac{58}{83} & \frac{35}{83} & \frac{15}{83} \\ \frac{35}{83} & \frac{34}{83} & -\frac{21}{83} \\ \frac{15}{83} & -\frac{21}{83} & \frac{74}{83} \end{pmatrix}$$

A.5

$$\begin{pmatrix} \frac{13}{14} & -\frac{1}{7} & -\frac{3}{14} \\ -\frac{1}{7} & \frac{5}{7} & -\frac{3}{7} \\ -\frac{3}{14} & -\frac{3}{7} & \frac{5}{14} \end{pmatrix}$$

A.6

$$\begin{pmatrix} \frac{2}{11} & -\frac{3}{11} & \frac{3}{11} \\ -\frac{3}{11} & \frac{10}{11} & \frac{1}{11} \\ \frac{3}{11} & \frac{1}{11} & \frac{10}{11} \end{pmatrix}$$

A.7

$$\begin{pmatrix} \frac{29}{30} & -\frac{1}{15} & -\frac{1}{6} \\ -\frac{1}{15} & \frac{13}{15} & -\frac{1}{3} \\ -\frac{1}{6} & -\frac{1}{3} & \frac{1}{6} \end{pmatrix}$$

A.8

$$\begin{pmatrix} \frac{52}{77} & \frac{20}{77} & \frac{30}{77} \\ \frac{20}{77} & \frac{61}{77} & -\frac{24}{77} \\ \frac{30}{77} & -\frac{24}{77} & \frac{41}{77} \end{pmatrix}$$

A.9

$$\begin{pmatrix} \frac{61}{86} & \frac{15}{43} & \frac{25}{86} \\ \frac{15}{43} & \frac{25}{43} & -\frac{15}{43} \\ \frac{25}{86} & -\frac{15}{43} & \frac{61}{86} \end{pmatrix}$$

A.10

$$\begin{pmatrix} \frac{29}{37} & -\frac{14}{37} & \frac{6}{37} \\ -\frac{14}{37} & \frac{25}{74} & \frac{21}{74} \\ \frac{6}{37} & \frac{21}{74} & \frac{65}{74} \end{pmatrix}$$

A.11

$$\begin{pmatrix} \frac{1}{37} & 0 & \frac{6}{37} \\ 0 & 1 & 0 \\ \frac{6}{37} & 0 & \frac{36}{37} \end{pmatrix}$$

A.12

$$\begin{pmatrix} \frac{25}{26} & -\frac{5}{26} & 0 \\ -\frac{5}{26} & \frac{1}{26} & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

A.13

$$\begin{pmatrix} \frac{25}{61} & \frac{18}{61} & \frac{24}{61} \\ \frac{18}{61} & \frac{52}{61} & -\frac{12}{61} \\ \frac{24}{61} & -\frac{12}{61} & \frac{45}{61} \end{pmatrix}$$

A.14

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

A.15

$$\begin{pmatrix} \frac{5}{21} & \frac{8}{21} & \frac{4}{21} \\ \frac{8}{21} & \frac{17}{21} & -\frac{2}{21} \\ \frac{4}{21} & -\frac{2}{21} & \frac{20}{21} \end{pmatrix}$$

A.16

$$\begin{pmatrix} \frac{61}{97} & \frac{30}{97} & -\frac{36}{97} \\ \frac{30}{97} & \frac{72}{97} & \frac{30}{97} \\ -\frac{36}{97} & \frac{30}{97} & \frac{61}{97} \end{pmatrix}$$

A.17

$$\begin{pmatrix} \frac{41}{77} & -\frac{30}{77} & -\frac{24}{77} \\ -\frac{30}{77} & \frac{52}{77} & -\frac{20}{77} \\ -\frac{24}{77} & -\frac{20}{77} & \frac{61}{77} \end{pmatrix}$$

A.18

$$\begin{pmatrix} \frac{61}{65} & \frac{12}{65} & \frac{2}{13} \\ \frac{12}{65} & \frac{29}{65} & -\frac{6}{13} \\ \frac{2}{13} & -\frac{6}{13} & \frac{8}{13} \end{pmatrix}$$

A.19

$$\begin{pmatrix} \frac{17}{66} & \frac{7}{66} & \frac{14}{33} \\ \frac{7}{66} & \frac{65}{66} & -\frac{2}{33} \\ \frac{14}{33} & -\frac{2}{33} & \frac{25}{33} \end{pmatrix}$$

A.20

$$\begin{pmatrix} \frac{2}{27} & \frac{5}{27} & \frac{5}{27} \\ \frac{5}{27} & \frac{26}{27} & -\frac{1}{27} \\ \frac{5}{27} & -\frac{1}{27} & \frac{26}{27} \end{pmatrix}$$

A.21

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{9}{13} & -\frac{6}{13} \\ 0 & -\frac{6}{13} & \frac{4}{13} \end{pmatrix}$$