

# 代数学幾何学 (A/B) 計算演習 [問題] (2009/06/04)

問. 次の平面への射影子行列を求めなさい

Q.1	$x - 4y - 6z = -13$	Q.8	$7x - 6y + 7z = 87$	Q.15	$3x - 3y - 2z = 2$
Q.2	$4x + 5y + 2z = 13$	Q.9	$6x - 5y + 5z = 37$	Q.16	$6x + 6y - 5z = -41$
Q.3	$2x - 5y + 6z = 30$	Q.10	$2x + 6y - 5z = 51$	Q.17	$2x + 7y + 3z = -41$
Q.4	$7x + 5y + 4z = 44$	Q.11	$4x + 4y - z = -35$	Q.18	$7y - 5z = -2$
Q.5	$x - 2y - 7z = 31$	Q.12	$2x - 3y - 3z = -9$	Q.19	$4x + 4y + 5z = 26$
Q.6	$2x - y = 10$	Q.13	$x - y + 3z = 25$	Q.20	$2x - 3y = 32$
Q.7	$2x + 7y = 45$	Q.14	$3x + 2y + 3z = -35$	Q.21	$5x + 6y + 3z = 59$

代数学幾何学 (A/B) 計算演習 [解答] (2009/06/04)

A.1

$$\begin{pmatrix} \frac{52}{53} & \frac{4}{53} & \frac{6}{53} \\ \frac{4}{53} & \frac{37}{53} & -\frac{24}{53} \\ \frac{6}{53} & -\frac{24}{53} & \frac{17}{53} \end{pmatrix}$$

A.8

$$\begin{pmatrix} \frac{85}{134} & \frac{21}{67} & -\frac{49}{134} \\ \frac{21}{67} & \frac{49}{67} & \frac{21}{67} \\ -\frac{49}{134} & \frac{21}{67} & \frac{85}{134} \end{pmatrix}$$

A.15

$$\begin{pmatrix} \frac{13}{22} & \frac{9}{22} & \frac{3}{11} \\ \frac{9}{22} & \frac{13}{22} & -\frac{3}{11} \\ \frac{3}{11} & -\frac{3}{11} & \frac{9}{11} \end{pmatrix}$$

A.2

$$\begin{pmatrix} \frac{29}{45} & -\frac{4}{9} & -\frac{8}{45} \\ -\frac{4}{9} & \frac{4}{9} & -\frac{2}{9} \\ -\frac{8}{45} & -\frac{2}{9} & \frac{41}{45} \end{pmatrix}$$

A.9

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

A.16

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

A.3

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

A.10

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

A.17

$$\begin{pmatrix} \frac{29}{31} & -\frac{7}{31} & -\frac{3}{31} \\ -\frac{7}{31} & \frac{13}{62} & -\frac{21}{62} \\ -\frac{3}{31} & -\frac{21}{62} & \frac{53}{62} \end{pmatrix}$$

A.4

$$\begin{pmatrix} \frac{41}{90} & -\frac{7}{18} & -\frac{14}{45} \\ -\frac{7}{18} & \frac{13}{18} & -\frac{2}{9} \\ -\frac{14}{45} & -\frac{2}{9} & \frac{37}{45} \end{pmatrix}$$

A.11

$$\begin{pmatrix} \frac{17}{33} & -\frac{16}{33} & \frac{4}{33} \\ -\frac{16}{33} & \frac{17}{33} & \frac{4}{33} \\ \frac{4}{33} & \frac{4}{33} & \frac{32}{33} \end{pmatrix}$$

A.18

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{25}{74} & \frac{35}{74} \\ 0 & \frac{35}{74} & \frac{49}{74} \end{pmatrix}$$

A.5

$$\begin{pmatrix} \frac{53}{54} & \frac{1}{27} & \frac{7}{54} \\ \frac{1}{27} & \frac{25}{27} & -\frac{7}{27} \\ \frac{7}{54} & -\frac{7}{27} & \frac{5}{54} \end{pmatrix}$$

A.12

$$\begin{pmatrix} \frac{9}{11} & \frac{3}{11} & \frac{3}{11} \\ \frac{3}{11} & \frac{13}{22} & -\frac{9}{22} \\ \frac{3}{11} & -\frac{9}{22} & \frac{13}{22} \end{pmatrix}$$

A.19

$$\begin{pmatrix} \frac{41}{57} & -\frac{16}{57} & -\frac{20}{57} \\ -\frac{16}{57} & \frac{41}{57} & -\frac{20}{57} \\ -\frac{20}{57} & -\frac{20}{57} & \frac{32}{57} \end{pmatrix}$$

A.6

$$\begin{pmatrix} \frac{1}{5} & \frac{2}{5} & 0 \\ \frac{2}{5} & \frac{4}{5} & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

A.13

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

A.20

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

A.7

$$\begin{pmatrix} \frac{49}{53} & -\frac{14}{53} & 0 \\ -\frac{14}{53} & \frac{4}{53} & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

A.14

$$\begin{pmatrix} \frac{13}{22} & -\frac{3}{11} & -\frac{9}{22} \\ -\frac{3}{11} & \frac{9}{11} & -\frac{3}{11} \\ -\frac{9}{22} & -\frac{3}{11} & \frac{13}{22} \end{pmatrix}$$

A.21

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