代数学幾何学 (A/B) 計算演習 [問題] (2010/01/21)

問. n 次の多項式からなる線型空間 $(\{\sum_{i=0}^{n} c_i x^i \mid c_i \ (i = 0..n) \in \boldsymbol{R}\})$ 上の線型変換 $T_b : f(x) \to f(x+b)$ の基底 E に関する行列を求めなさい。

Q.1

$$\begin{aligned} b &= -2 \\ E &= < x - 2x^2,\ x^2,\ 1 - 2x + x^2 > \end{aligned}$$

Q.2

$$\begin{aligned} b &= 2 \\ E &= < 2 - 4x + 5x^2,\ 2 - 5x + 6x^2,\ 3 - 6x + 8x^2 > \end{aligned}$$

Q.3

$$\begin{aligned} b &= 3 \\ E &= < 3 - 2x,\ 1 - 2x - 3x^2,\ x + 2x^2 > \end{aligned}$$

Q.4

$$\begin{aligned} b &= -2 \\ E &= < -1 + 2x^2,\ -x + 3x^2,\ 1 - x + 2x^2 > \end{aligned}$$

Q.5

$$\begin{aligned} b &= -3 \\ E &= < -2 - x - 5x^2,\ x + 2x^2,\ -1 - x - 3x^2 > \end{aligned}$$

Q.6

$$\begin{aligned} b &= -3 \\ E &= < 3 + 2x + 2x^2,\ 3 + 2x + 3x^2,\ 4 + 3x + 4x^2 > \end{aligned}$$

Q.7

$$\begin{aligned} b &= 1 \\ E &= < 1 + x + x^2,\ -x - x^2,\ -4 + 2x + x^2 > \end{aligned}$$

Q.8

$$\begin{aligned} b &= -1 \\ E &= < -x - x^2,\ -1 + x + x^2,\ -1 - x > \end{aligned}$$

Q.9

$$\begin{aligned} b &= 2 \\ E &= < 1,\ -x + 2x^2,\ 1 - 3x + 5x^2 > \end{aligned}$$

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A.1

$$\begin{pmatrix} -11 & 4 & 12 \\ -14 & 5 & 16 \\ -10 & 4 & 9 \end{pmatrix}$$

A.2

$$\begin{pmatrix} 9 & 8 & 16 \\ -44 & -51 & -72 \\ 28 & 34 & 45 \end{pmatrix}$$

A.3

$$\begin{pmatrix} 7 & 69 & -45 \\ -24 & -239 & 156 \\ -36 & -360 & 235 \end{pmatrix}$$

A.4

$$\begin{pmatrix} -15 & -22 & -14 \\ 16 & 21 & 12 \\ -8 & -8 & -3 \end{pmatrix}$$

A.5

$$\begin{pmatrix} 19 & -9 & 12 \\ 54 & -17 & 30 \\ 6 & 3 & 1 \end{pmatrix}$$

A.6

$$\begin{pmatrix} 13 & 21 & 27 \\ 72 & 115 & 150 \\ -60 & -96 & -125 \end{pmatrix}$$

A.7

$$\begin{pmatrix} 11 & -10 & 11 \\ 12 & -11 & 13 \\ 2 & -2 & 3 \end{pmatrix}$$

A.8

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

A.9

$$\begin{pmatrix} 1 & 22 & 54 \\ 0 & 41 & 100 \\ 0 & -16 & -39 \end{pmatrix}$$