

BAB IV

PENUTUP

Kesimpulan

Berdasarkan hasil dan pembahasan, dapat disimpulkan bahwa:

1) Determinan matriks *Quaternion* ukuran 3×3 , misal $A =$

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

terbagi tiga yaitu,

a. Determinan baris matriks *Quaternion*, yang tergantung pada barisnya, yaitu,

$$\begin{aligned} \text{rdet}_1(A) &= a_{11}a_{22}a_{33} - a_{11}a_{23}a_{32} + a_{12}a_{23}a_{31} - a_{12}a_{21}a_{33} \\ &\quad + a_{13}a_{32}a_{21} - a_{13}a_{31}a_{22}, \end{aligned}$$

$$\begin{aligned} \text{rdet}_2(A) &= a_{22}a_{11}a_{33} - a_{22}a_{13}a_{31} + a_{21}a_{13}a_{32} - a_{21}a_{12}a_{33} \\ &\quad + a_{23}a_{31}a_{12} - a_{23}a_{32}a_{11}, \end{aligned}$$

$$\begin{aligned} \text{rdet}_3(A) &= a_{33}a_{11}a_{22} - a_{33}a_{12}a_{21} + a_{32}a_{21}a_{13} - a_{32}a_{23}a_{11} \\ &\quad + a_{31}a_{12}a_{23} - a_{31}a_{13}a_{22}. \end{aligned}$$

b. Determinan kolom matriks *Quaternion*, yang tergantung pada kolomnya, yaitu,

$$\text{cdet}_1(A) = a_{33}a_{22}a_{11} - a_{23}a_{32}a_{11} + a_{12}a_{23}a_{31} - a_{22}a_{13}a_{31}$$

$$+ a_{13}a_{32}a_{21} - a_{33}a_{12}a_{21},$$

$$\text{cdet}_2(A) = a_{33}a_{11}a_{22} - a_{13}a_{31}a_{22} + a_{23}a_{31}a_{12} - a_{33}a_{21}a_{12}$$

$$+ a_{21}a_{13}a_{32} - a_{11}a_{23}a_{32},$$

$$\text{cdet}_3(A) = a_{22}a_{11}a_{33} - a_{12}a_{21}a_{33} + a_{31}a_{12}a_{23} - a_{11}a_{32}a_{23}$$

$$+ a_{32}a_{21}a_{13} - a_{22}a_{31}a_{13}.$$

c. Determinan ganda matriks *Quaternion* dapat menggunakan salah satu dari determinan baris atau determinan kolom.

2) Solusi persamaan matriks *Quaternion* dengan menggunakan aturan *Cramer* ukuran 3×3 adalah sebagai berikut. Misalkan matriks $A, B, C \in M(n, \mathbb{H})$ diketahui, $X \in M(n, \mathbb{H})$ tidak diketahui,

$$x_{ij} = \frac{\text{cdet}_j(A^*A)_{*i}(c_{*j}^B)}{\text{ddet}(A) \cdot \text{ddet}(B)},$$

dengan $i, j = 1, \dots, 3$

