

Some centralizable matrices over a Skew-field*

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On the basis of some results^[1~3] of the Xie Bangjie professor, this paper proved:

Theorem 1. The quadratic zero matrices, the idempotent matrices and the involutory matrices over any skew-field are all centralizable matrices, and

(i) If A is a quadratic zero matrix, then $\|A\| = 0$;

(ii) If A is a idempotent matrix, then $\|A\| = \begin{cases} 1, & \text{if } A = I_n, \\ 0, & \text{if } A \neq I_n; \end{cases}$

(iii) If A is a involutory matrix, then $\|A\| = 1$ or $\|A\| = -1$,

Theorem 2. Let K be a skew-field with the involutory anti-automorphism σ , where $\sigma(a) = a$ if and only if $a \in F$, F is center of K . Again let

$$A = \begin{pmatrix} a_1 & & * \\ & a_2 & \\ \bigcirc & & a_n \end{pmatrix} \quad (\text{or} \quad A = \begin{pmatrix} a_1 & & \bigcirc \\ & a_2 & \\ * & & a_n \end{pmatrix}) \in K^{n \times n}$$

where $a_1, a_2, \dots, a_n \in F$, then A is a centralizable matrix over K , and $\|A\| = a_1 a_2 \dots a_n$.

References

- [1] 谢邦杰, 体上特征矩阵的法式与弱法式存在定理, 数学学报, 23: 3(1980), 398—410.
- [2] ———, 四元数自共轭矩阵与行列式, 吉林大学自然科学学报, 25(1980), 19—35.
- [3] ———, 抽象代数学, 上海科学技术出版社, 1982.

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