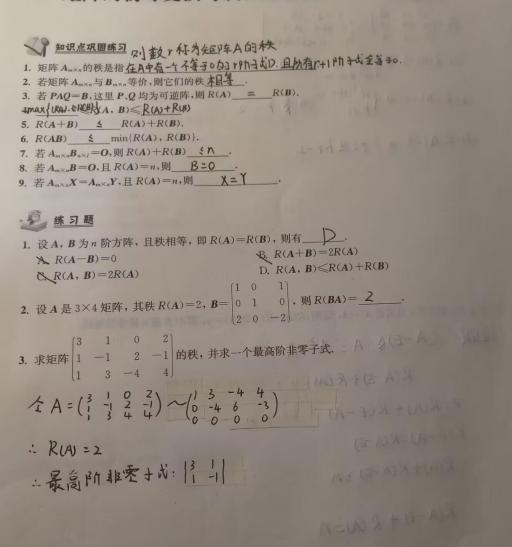
矩阵的初等变换与线性方程组——矩阵的秩



4. 设
$$A = \begin{pmatrix} 1 & -2 & 3k \\ -1 & 2k & -3 \\ k & -2 & 3 \end{pmatrix}$$
, 同 k 为何值, 可使

(1) $R(A) = 1$; (2) $R(A) = 2$;

$$A = \begin{pmatrix} -1 & 2k & -3 \\ -1 & 2k & -3 \\ k & -2 & 3 \end{pmatrix} \sim \begin{pmatrix} 1 & -2 & 3k \\ 0 & 2k-2 & 3k-3 \\ 0 & 0 & 2k^2 - 3k+6 \end{pmatrix}$$

(1) $R(A) = 1 \Rightarrow \begin{pmatrix} 2k-2 = 0 \\ 2k^2 - 3k + 6 = 0 \\ 3k^2 - 3k + 6 = 0 \end{pmatrix} \Rightarrow k = 1$

(2) $R(A) = 2 \Rightarrow \begin{cases} 3k^2 - 3k + 6 = 0 \\ 2k^2 - 3k + 6 = 0 \end{cases} \Rightarrow k = -2$

(3) $R(A) = 3 \Rightarrow k \neq 1$ $R(A) = 3 \Rightarrow k \neq 1$

5. 设A为n阶方阵,且满足 $A^2=A$,证明:R(A-E)+R(A)=n,其中 E 是n 阶单位矩阵。

: R(A-E)+R(A) =n

2: R(A) + R(E-A) ", R(E)=n

K(E-A)=R(A-E)

: RAHKA-E) >n

: R(A-E) + R (A)=n