



# 7

## 7.1

$$A = \begin{pmatrix} 3 & -2 & -4 \\ -2 & 6 & -2 \\ -4 & -2 & 3 \end{pmatrix}$$

3

**Aitken**

## 7.2

$$A = \begin{pmatrix} 3 & -4 & 3 \\ -4 & 6 & 3 \\ 3 & 3 & 1 \end{pmatrix}。$$



### 7.3

$$A = \begin{pmatrix} 6 & 2 & 1 \\ 2 & 3 & 1 \\ 1 & 1 & 1 \end{pmatrix}$$

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### 7.4 Jacobi

:

$$A_1 = \begin{pmatrix} 4 & 0 & 0 \\ 0 & 3 & 1 \\ 0 & 1 & 3 \end{pmatrix}, A_2 = \begin{pmatrix} 1.0 & 1.0 & 0.5 \\ 1.0 & 1.0 & 0.25 \\ 0.5 & 0.25 & 2.0 \end{pmatrix} \circ$$

### 7.5

$$x = (1,1,1,1)^T$$

$P,$

$$Px = \pm \|x\|_2 e_1$$



1 P  
2 P

7.6 (1)  $A \in R^{n \times n}$   $\lambda$   $x(\|x\|_2=1)$  A  
P  $Px = e_1$  ,

$$PAP^T = \begin{pmatrix} \lambda & \mathbf{0} \\ \mathbf{0} & B \end{pmatrix} \circ$$

(2)

$$A = \begin{pmatrix} 2 & 10 & 2 \\ 10 & 5 & -8 \\ 2 & -8 & 11 \end{pmatrix}$$

$$\lambda = 9 \quad x = (2/3 \quad 1/3 \quad 2/3)^T$$

$$P \quad Px = e_1, \quad PAP^T$$



### 7.7

$$A = \begin{pmatrix} 1 & 3 & 4 \\ 3 & 1 & 2 \\ 4 & 2 & 1 \end{pmatrix} \circ$$

### 7.8

QR

$$A = \begin{pmatrix} 1 & 1 & 1 \\ 2 & -1 & -1 \\ 2 & -4 & 5 \end{pmatrix} \circ$$

### 7.9

Hessenberg

QR

$$(1)A = \begin{pmatrix} 0 & 2 & -2 \\ -1 & 2 & -2 \\ & -1 & 1 \end{pmatrix}, (2)A = \begin{pmatrix} 3 & 1 & \\ 1 & 4 & 2 \\ & 2 & 1 \end{pmatrix} \circ$$



7.10

$A \in R^{n \times n}$  *Hessenberg* .  $QR$

$$A = QR, B = Q^T A Q = RQ,$$

$Q$   $R$  *Hessenberg*

