

Ex.1.1 | Ch.1 | P10 | chloe | 2025.07.13

解：(a)  $\langle j^2 \rangle = \sum j^2 p(j) = \sum j^2 \cdot \frac{N(j)}{N}$

$$= \frac{14^2 \times 1}{14} + \frac{15^2 \times 1}{14} + \frac{16^2 \times 3}{14} + \frac{22^2 \times 3}{14} + \frac{24^2 \times 2}{14} + \frac{25^2 \times 5}{14}$$

$$= \frac{6434}{14} \approx 459.57$$

$$\langle j \rangle^2 = [\sum j p(j)]^2 = [\sum j \cdot \frac{N(j)}{N}]^2 = 21^2 = 441$$

(b)  $\sigma^2 \equiv \langle (\Delta j)^2 \rangle = \sum (j - \langle j \rangle)^2 \cdot p(j)$

$$= (14-21)^2 \cdot \frac{1}{14} + (15-21)^2 \cdot \frac{1}{14} + (16-21)^2 \cdot \frac{3}{14} + (22-21)^2 \cdot \frac{3}{14}$$

$$+ (24-21)^2 \cdot \frac{2}{14} + (25-21)^2 \cdot \frac{5}{14}$$

$$= 260/14$$

$$= 18.57$$

(c)  $\sigma^2 \equiv \langle (\Delta j)^2 \rangle = \langle j^2 \rangle - \langle j \rangle^2$

$$= 459.57 - 441$$

$$= 18.57$$

使式(1.11)和使用式(1.12)计算结果一致