

## §1.7 独立试验序列

例7.4. 甲、乙两人比赛, 每局甲赢的概率为 $p$ , 乙赢的概率为 $q = 1 - p$ , 赢者得1分, 输者得0分. 累计多2分者胜出. 求: 甲胜出的概率.

- $A =$ “甲胜出”,  $B =$ “头两局甲赢”,  $\tilde{B} =$ “头两局乙赢”,  
 $C =$ “头两局甲、乙各赢一局”.
- $A = B \cup (CA)$ , 于是

$$P(A) = P(B) + P(C)P(A|C) = P(B) + P(C)P(A).$$

- $P(B) = p^2$ ,  $P(C) = 2pq$ .
- 解得:

$$P(A) = \frac{p^2}{1 - 2pq} = \frac{p^2}{p^2 + q^2} = P(B|B \cup \tilde{B}).$$

例7.5. 甲、乙两人轮流投两颗骰子(甲先). 甲胜的目标: 投出(总和为) 6 点; 乙胜的目标: 投出(总和为) 7 点. 求: 甲胜的概率.

- 令  $A =$  “甲胜”,  $B =$  “甲第1次投出6点”,  
 $C =$  “乙第1次投出7点”.

- $A = B \cup (B^c C^c A)$ , 于是

$$P(A) = P(B) + P(B^c C^c)P(A|B^c C^c) = P(B) + P(B^c C^c)P(A).$$

- $P(B) = \frac{5}{36}$ ,  $P(B^c C^c) = (1 - \frac{5}{36}) \times (1 - \frac{6}{36}) = \frac{31}{36} \times \frac{5}{6}$ .
- 解得:

$$P(A) = \frac{\frac{5}{36}}{1 - \frac{31}{36} \times \frac{5}{6}} = \frac{30}{36 \times 6 - 31 \times 5} = \frac{30}{61}.$$