§1.1 随机事件 §1.2 随机事件的概率

一 选择填空题

1	2	3		4				5	6
D	C	$\bar{A}\bar{B}\bar{C}\ (\overline{A\cup B\cup C})$	$\bar{A}\cup\bar{B}\cup\bar{C}(\overline{ABC})$	1/5	1/3	2/5	4/5	5/9	0.6

二 计算题

1. $P(AB)=0.7-0.5=0.2$ $P(\bar{A}B)=0.4-0.2=0.2$

$P(\bar{A}\bar{B})=1-P(A\cup B)=1-0.9=0.1$

$$P(B|A\cup\bar{B})=\frac{P(AB)}{P(A)+P(\bar{B})-P(A\bar{B})}=\frac{0.2}{0.7+0.6-0.5}=0.25$$

2. $P(AB)=P(A)+P(B)-P(A\cup B)=1.3-P(A\cup B)$

$A\cup B=\Omega, P(AB)=0.3$ $A\subset B, P(AB)=0.6$

3. $p=1/5$

$A=\{n|n\equiv 0(\mathrm{mod}3)\}$，$B=\{n|n\equiv 0(\mathrm{mod}4)\}$

$P(A)=333/1000$ $P(B)=250/1000$ $P(AB)=83/1000$

$P(A\cup B)=P(A)+P(B)-P(AB)=1/2$ $P(\bar{A}\bar{B})=1-P(A\cup B)=1/2$

§1.3 条件概率

一 选择填空题

1	2	3	4			5			6	7
B	1234	0.5	1/2	3/8	1/12	15/36	2/15	2/5	0.64	5/12

二 计算题

1. $P(A)=3/8$，$P(B)=7/8$，$P(A|B)=3/7$

2. $p_1=1-\frac{8}{10}\times\frac{7}{9}\times\frac{6}{8}=\frac{8}{15}$ $p_2=\frac{C_2^1C_8^2}{C_{10}^3}=\frac{7}{15}$

$p_3=\frac{8}{10}\times\frac{7}{9}\times\frac{2}{8}=\frac{7}{45}$ $p_4=\frac{2}{10}\times\frac{1}{9}+\frac{8}{10}\times\frac{2}{9}=\frac{1}{5}$

3. $0.5\times0.6+0.5\times0.2=0.4$ $\frac{0.5\times0.6}{0.5\times0.6+0.5\times0.2}=0.75$

4. $\frac{0.99\times1}{0.01\times0.1+0.99\times1}=\frac{990}{991}$

5. $0.2\times0.9+0.8\times0.3=0.42$ $\frac{0.2\times0.9}{0.2\times0.9+0.8\times0.3}=\frac{3}{7}$

6. $\frac{C_8^2}{C_{10}^2}\times\frac{C_6^2}{C_8^2}+\frac{C_8^1C_2^1}{C_{10}^2}\times\frac{C_7^1C_1^1}{C_8^2}=\frac{1}{3}+\frac{4}{45}=\frac{19}{45}$ $\frac{\frac{1}{3}}{\frac{1}{3}+\frac{4}{45}}=\frac{15}{19}$

§1.4 随机事件的独立性

一 选择填空题

1	2	3		4	5	6		7
A	$1/2$	0.5	0.2	6	$1/5$	0.79	0.44	$5/9$

二 计算题

1. $P(B)=0.4, P(A|B)=0$ $P(B)=0.8, P(A|B)=0.5$ $P(B)=2/3, P(A|B)=0.4$

2. $P\{\text{甲胜}\}=0.6^3+C_3^1 0.6^3 0.4+C_4^2 0.6^3 0.4^2\approx 0.68$

$$P\{\text{甲 3:2 胜}|\text{甲胜}\}=\frac{C_4^2 0.6^3 0.4^2}{0.6^3+C_3^1 0.6^3 0.4+C_4^2 0.6^3 0.4^2}=\frac{24}{79}\approx 0.3$$

$$P\{\text{甲胜第一局}|\text{甲胜}\}=\frac{0.6^3+C_2^1 0.6^3 0.4+C_3^1 0.6^3 0.4^2}{0.6^3+C_3^1 0.6^3 0.4+C_4^2 0.6^3 0.4^2}=\frac{57}{79}\approx 0.72$$

3. $P\{\text{回答正确}\}=p\times 1+(1-p)\times\frac{1}{m}=\frac{1+(m-1)p}{m}$

$$\frac{p\times 1}{p\times 1+(1-p)\times\frac{1}{m}}=\frac{mp}{1+(m-1)p}$$

$$1-\left(\frac{m-1}{m}\right)^5-\frac{5}{m}\left(\frac{m-1}{m}\right)^4$$