Hw1

2023年3月7日 12:31

chap 1

2. (1) $A_1\bar{A}_2\bar{A}_3+\bar{A}_1A_2\bar{A}_3+\bar{A}_1\bar{A}_2A_3$

(2) $\bar{A}_1\bar{A}_2A_3+\bar{A}_1A_2\bar{A}_3+\bar{A}_1A_2A_3+A_1\bar{A}_2\bar{A}_3+A_1\bar{A}_2A_3+A_1A_2\bar{A}_3+A_1A_2A_3$

(3) $A_1A_2\bar{A}_3+A_1\bar{A}_2A_3+A_1A_2A_3$

(4) $\bar{A}_1\bar{A}_2\bar{A}_3+A_1\bar{A}_2\bar{A}_3+\bar{A}_1A_2\bar{A}_3+\bar{A}_1\bar{A}_2A_3$

8. $P(A\cup B\cup C)=P(A)+P(B)+P(C)-P(AB)-P(AC)-P(BC)+P(ABC)$

$=1-\frac{1}{4}+0=\frac{3}{4}$

12. 三局两胜制

$P(\text{甲胜})=p^2+C_2^1\times p^2(1-p)$

$=p^2(3-2p)$

五局三胜制

$P(\text{甲胜})=p^3+C_3^1\times p^3(1-p)+C_4^2p^3(1-p)^2$

$p^3(6p^2-15p+10)$

$p^2(3-2p)-p^3(6p^2-15p+10)$

$=3p^2(-2p^3+5p^2-4p+1)$

$f(p)=-2p^3+5p^2-4p+1$

$f'(p)=-6p^2+5p-4$

$f'(p)=-12p+5<0$

$f'(p)\downarrow$，$f'(p)<f'(\frac{1}{2})<0$

$f(p)\downarrow$，$f(p)<f(\frac{1}{2})=0$

故主局三胜制对甲更有利

13. 设乙在X号盒子抽球

$P(X=n)=(\frac{1}{2})^{n-1}\cdot\frac{1}{2}=(\frac{1}{2})^{n}$

此时甲胜$=(\frac{1}{2})^{n}\times\frac{1}{n+1}<(\frac{1}{2})^{n+1}\ (n>1)$

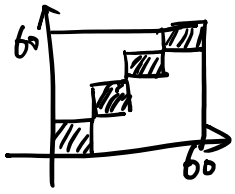
$P(\text{甲胜})<\sum_{n=1}^{+\infty}(\frac{1}{2})^{n+1}<\frac{1}{2}$

对乙更有利.

17. 设甲到达时刻为x，乙到达时刻为y

$(0\le x,y\le 60)$

设第一辆车3:00发车



$P=\frac{4\times 15^2}{60^2}=\frac{1}{4}$