

Chapter six The limiting theory

1)The theory of law of large number.

1.1)The strong law of large number.

X_n is a sequence random variable , $n=1,2,3,\dots$

$X_n \xrightarrow[n \rightarrow \infty]{a.s.} X$, a.s. is almost surely.

$$P(|X_n - X| < \varepsilon) \geq 1 - \frac{E[(X_n - X)^2]}{\varepsilon^2} \xrightarrow[n \rightarrow \infty]{} 1.$$

1.2)

X_n is a sequence random variable , $n=1,2,3,\dots$

$X_n \xrightarrow[n \rightarrow \infty]{q.m.} X$, a.s. is quadratic mena.

$$E[(X_n - X)^2] \xrightarrow[n \rightarrow \infty]{} 0$$

1.3)The weak law of large number.

X_n is a sequence random variable , $n=1,2,3,\dots$

$X_n \xrightarrow[n \rightarrow \infty]{p.} X$, p is probability.

$$P(|X_n - X| \geq \varepsilon) \leq \frac{E[(X_n - X)^2]}{\varepsilon^2} \xrightarrow[n \rightarrow \infty]{} 0.$$

1.4)

X_n is a sequence random variable , $n=1,2,3,\dots$

$F_{X_n}(x) \xrightarrow[n \rightarrow \infty]{d.} F_X(x)$, d is distribution.

1.5)The relation.

$a.s. \Rightarrow p. \Rightarrow d.$

\uparrow

$q.m.$