No.

Date 2018/6/8 qualify exam: (集体期末)

probability: 1. ① $y_n \xrightarrow{d} 0$, $\xi_n \xrightarrow{d} \xi$, $y_n+\xi_n \xrightarrow{d} \xi+y$? 加什么条件?

② $P(X_k=\pm k)=\frac{1}{2k^2}$, $P(X_k=\pm 1)=\frac{1}{2}(1-\frac{1}{k^2})$

$\begin{cases} S_n/(\sum_1^n X_i^2) \to ? & \text{(limiting distribution)} \\ S_n/\sqrt{n}\log n \to 0 \text{ a.s.} \end{cases}$

2. X_i iid $U(-1,1)$

(a). limiting distribution $W_n=\frac{1}{n}\sum_{1\le i<j\le n} X_iX_j$

(b) $S_n/\sqrt{n}\log n \to 0$ a.s.

(c). $P(|S_n|>\sqrt{n}t)\le 2\exp(-\frac{t^2}{2})$ [类似 self-normalized inequality]

3. martingale inequality. S_n submartingale.

① $ES_{n\wedge T}\le ES_n$.

② $xP(\max_{0\le m\le n} S_m^+ \ge x)\le E S_n^+ 1\{\max_{0\le m\le n} S_m^+\ge x\}$.

③ $E(\max_{0\le m\le n} S_m^+)^2 \le 4\sum_1^n EX_i^2$

$S_n-S_{n-1}=X_n$..

SEM: Song

1. posterior $\begin{cases} \text{I known} \\ \text{I unknown} \quad \text{IW}. \end{cases}$

2. ① Assumption of Mixture Model

② What challenge will meet in Mixture model? How to solve the problem?

③ How to estimate & model selection

④ Use real example to illustrate Mixture model & linear regression?

linear model.

1. $\begin{pmatrix} Y_1 \\ Y_2 \\ Y_3 \end{pmatrix}=\begin{pmatrix} 1 & 1 \\ 0 & 2 \\ 1 & -1 \end{pmatrix}\begin{pmatrix} \theta_1 \\ \theta_2 \end{pmatrix}+\begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \end{pmatrix}$

a. $\hat\theta_1, \hat\theta_2$?

b. $\hat\sigma^2$? by (Y_1,Y_2,Y_3) & $(\hat\theta_1,\hat\theta_2)$