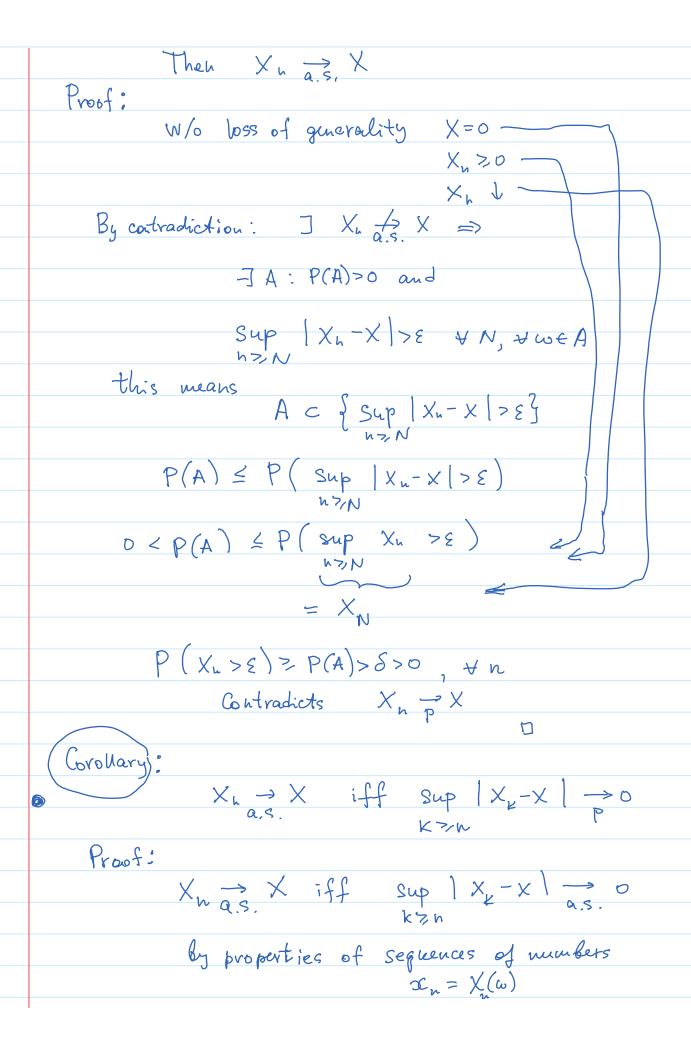
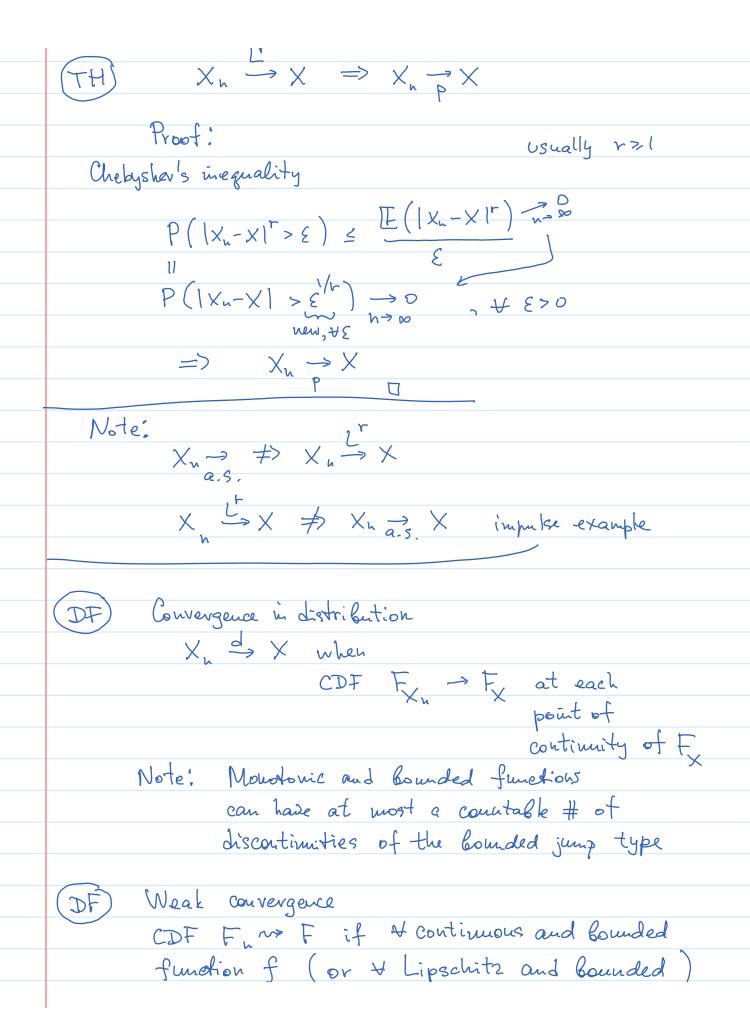
Lecture 14. conv continued

Wednesday, November 1, 2017 10:13 AM



Sufficiency: Cohv. in p $\sup_{k>h} |X_k - X| \rightarrow 0$ K>h $\sup_{k>h} |X_k - X| \rightarrow 0$ Monotonicity $\sup_{k>h} |X_k - X| \rightarrow 0$ K>h $\lim_{k>h} |X_k - X| \rightarrow 0$ $\times_{h} \rightarrow \times$ $X_{n} \rightarrow X \Rightarrow Sup |X_{k} - X| \xrightarrow{a.s.} 0 \Rightarrow$ $X_{n} \rightarrow X_{n} \rightarrow X$ Necessity $\Rightarrow \quad \text{Sup} \mid \times_{k} - \times \mid \rightarrow 0$ Yet another additional condition $\int_{\infty}^{\infty} P(|X_{n}-X|>\varepsilon) < \omega_{\gamma} + \varepsilon$ Series converges i.e. $P(1\times_n - \times 1 > E)$ goes $X_n \rightarrow X$ to 0 faster than they otherwise could in = Note: $\sum_{h=1}^{\infty} P(|X_h - X| > \epsilon) < \infty = \sum_{h=1}^{\infty} X_h \rightarrow X$ Proof: $P(\bigcup_{k>k} \{|x_k-x|>\epsilon\}) \leq \sum_{k>k} P(\{|x_k-x|>\epsilon\})$ > 0 By properties of Sequences of numbers B/c series ZAP (...) < A



 $\mathbb{E}f(X_n) \to \mathbb{E}f(X) = \int f(x) dF(x)$ S f(x) d F(x)

Note: f is called Lipschitz if |f(x)-f(y)\ \(\) Y x, y

Lemma Portmanteau

3 => ~ w/o proof