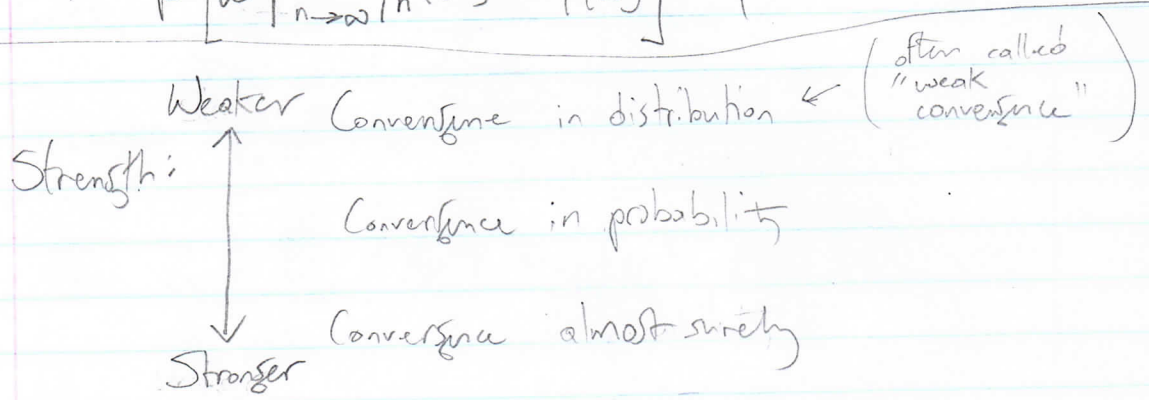
3) Convergence almost surely

$$P\left[\omega \,\middle|\, \lim_{n\to\infty} Y_n(\omega) = Y(\omega)\right] = 1$$



Remark: convergence almost surely
$\Rightarrow$ convergence in probability
$\Rightarrow$ convergence in distribution

Def: **Stochastic Convergence**

$Y_n \longrightarrow c$ (Stochastically) if $Y_n \xrightarrow{d} Y$ in probability where $P[Y=c]=1$.

(i.e. $\forall \varepsilon > 0 \quad \lim_{n\to\infty} P[|Y_n - c| < \varepsilon] = 1$)

Equivalently, $\lim_{n\to\infty} M_n(t) = e^{ct}$ on $(-\delta, \delta)$ (For some $\delta > 0$)