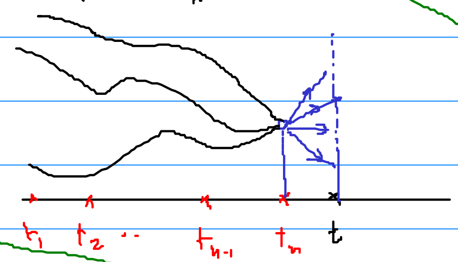
10/ Markov processes:

$$P(X_t = x \mid X_{t_1} = x_1, \dots, X_{t_n} = x_n)$$

$$= P(X_t = x \mid X_{t_n} = x_n) \qquad t_1 < \dots < t_n.$$



given any X_t with indep increments:

$$P[X_t = x \mid X_{t_1} = x_1, \dots, X_{t_n} = x_n] = P[X_t - X_{t_n} = x - x_n \mid X_{t_n} = x_n,\ X_{t_i} - X_{t_{i-1}} = x_i - x_{i-1},\ i = 2:n]$$

$$= P[X_t - X_{t_n} = x - x_n \mid X_{t_n} = x_n]$$

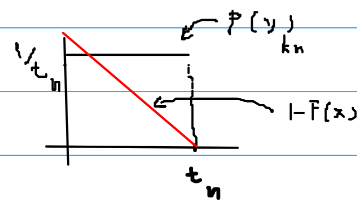
$$= P[X_t = x \mid X_{t_n} = x_n]$$

$\to$ $\{X_t\}$ is Markovian

11/ $Y_{1n}, Y_{2n}, \dots, Y_{nn}$ triangular array of R.V.

iid, uniformly distributed on $(0, t_n)$

$Z_n = \min(Y_{1n}, \dots, Y_{nn})$



a/ $P(Z_n > x) = P(Y_{1n} > x, \dots, Y_{nn} > x)$

$= P(Y_{1n} > x) \dots P(Y_{nn} > x)$

$= [1 - F(x)]^n \qquad F(x) = P[Y_{kn} \le x] \quad \forall k$

$= \exp n \log(1 - F(x))$

b/ $\log P(Z_n > x) = n \log(1 - x/t_n) = n\left\{-\frac{x}{t_n} + o\left(\frac{x}{t_n}\right)\right\} = -x\left(\frac{n}{t_n} + o\left(\frac{n}{t_n}\right)\right)$ $\quad \frac{n}{t_n} \to \lambda$

$\left\{ P[Z_n > x] \xrightarrow[n\infty]{} e^{-\lambda x} \right.$