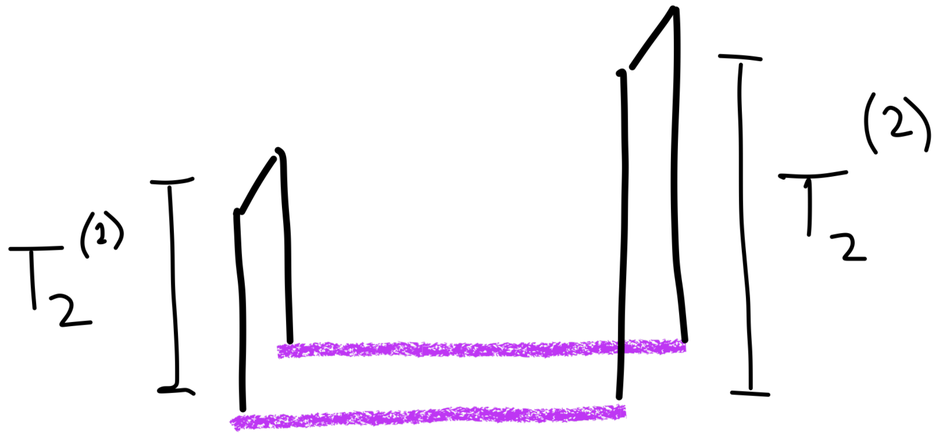
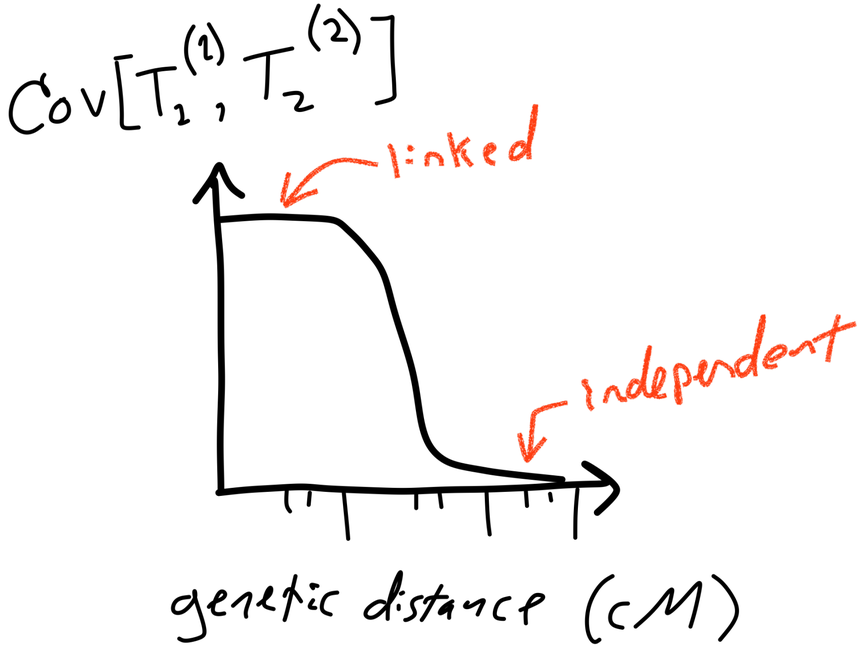
Decay of linkage

Larger genetic distance
$\Rightarrow$ recombination more likely





Deeper coalescence
$\Rightarrow$ shorter span

$$X \mid t \sim \exp(4Nrt)$$

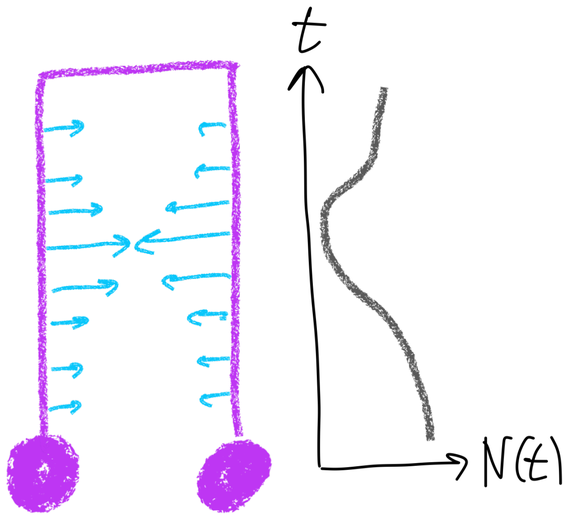
X: genetic dist. to recomb.

r: recombination rate

Previously on...

Population size determines coalescence rate

What if population size varies over time? $N(t)$



$N(t)$ distorts time scale from the standard coalescent

- time compressed when $N(t)$ is small
- time stretched when $N(t)$ is large

The details:

$$P(T_i = t_i) = \frac{\binom{i}{2}}{2N_{t_i}} \prod_{j=2}^{t_{i-1}} \left(1 - \frac{\binom{i}{2}}{2N_j}\right)$$

big N $\rightarrow$ $$p(t_i) = \frac{\binom{i}{2}}{2N(t)} e^{-\binom{i}{2}\int_0^t \frac{ds}{2N(s)}}$$

inhomogeneous Poisson process