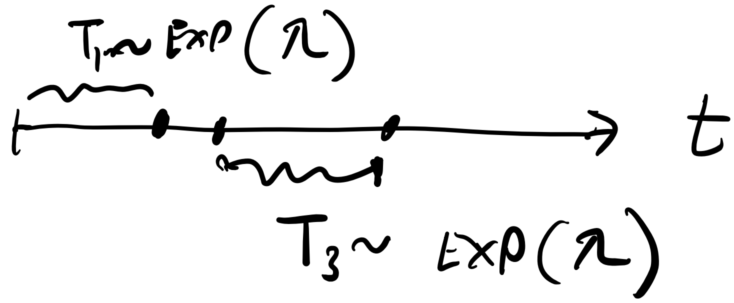
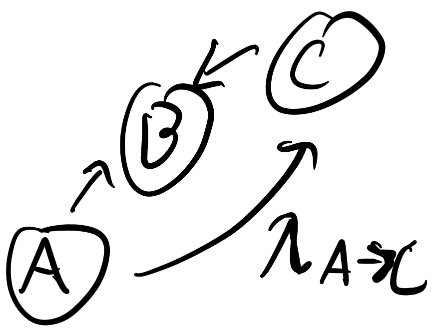
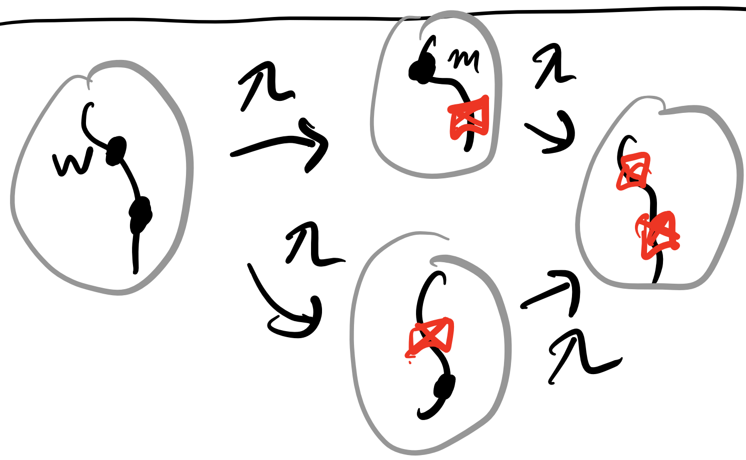
POISSON PROCESS

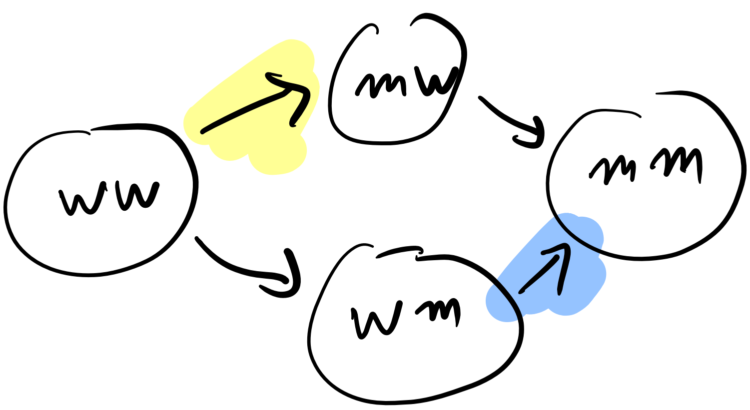


CONTINUOUS TIME MARKOV CHAIN



EX



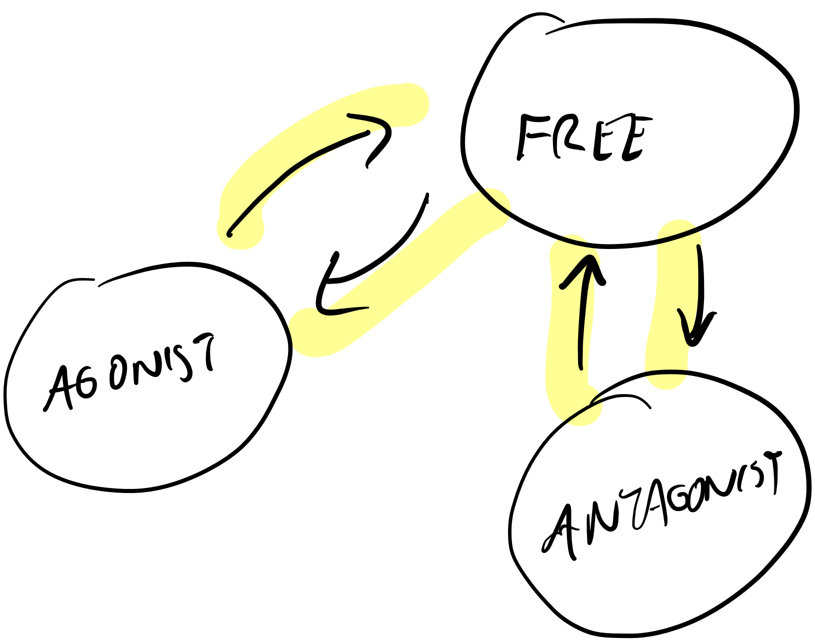


$$\underline{\underline{M}} = \begin{array}{c} \left[\begin{array}{cccc} -2\lambda & 0 & 0 & 0 \\ \lambda & -\lambda & 0 & 0 \\ \lambda & 0 & -\lambda & 0 \\ 0 & \lambda & \lambda & 0 \end{array}\right] \end{array} \begin{array}{l} ww \\ mw \\ wm \\ mm \end{array}$$

$$\mathbb{P}_i(t)$$

$$\frac{d}{dt} \vec{\mathbb{P}}(t) = \underline{\underline{M}} \cdot \vec{\mathbb{P}}(t)$$

PS5



TEST $\alpha = 0$ THEN

$$f_{AGONIST} = 0 \qquad \cancel{f_{ANTAGONIST} = 1}$$

$\alpha = 1$

$$f_{ANTAGONIST} = 0$$

LONG RUN

$$\frac{d}{dA} = 0$$

$$\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} = \begin{array}{ccc} \text{FREE} & \text{AG} & \text{ANTAG} \\ \left[\begin{array}{c|c|c} -\alpha\lambda & & \\ \hline (1-\alpha)\lambda & & \\ \hline \lambda & & \end{array}\right] \end{array} \cdot \begin{bmatrix} P_f \\ P_{ag} \\ P_{antag} \end{bmatrix}$$

$$\left[\begin{array}{c|c|c} -\lambda & \mu_2 & \mu_1 \\ \hline \alpha\lambda & -\mu_2 & 0 \\ \hline (1-\alpha)\lambda & 0 & -\mu_1 \end{array}\right]$$

TEST

$\mathcal{M}_1 \to 0$

$f_{FREE} = 0$

$f_{AG} = 0$

$f_{ANT} = 1$

$\mathcal{M}_2 \to 0$

$f_{FREE} = 0$

$f_{AG} = 1$

$f_{ANAG} = 0$

MEAN FIRST PASSAGE TIME

FROM STATE i TO j IS:

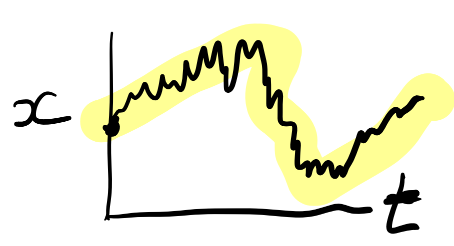
$\underline{M}_{-j}$ - TRANSITION MATRIX WITH j^{TH} ROW & COLUMN REMOVED

$$\begin{array}{l} \\ \\ \\ i^{TH}\ \text{ROW} \rightarrow \\ \\ \\ \end{array} \begin{bmatrix} 0 \\ 0 \\ 0 \\ -1 \\ 0 \\ 0 \end{bmatrix} = M_{-j} \cdot \vec{T}_K \qquad \vec{T}_K = \begin{bmatrix} T_{i\to K} \\ \vdots \\ \vdots \\ T_{i\to N+1} \end{bmatrix}$$

$$E[T_{i\to j}] = \sum_{k} T_k$$

- PARAMETRIC HETEROGENEITY

DISCRETE STATE DISCRETE TIME	DISCRETE STATE CONTINUOUS TIME	CONTINUOUS STATE CONTINUOUS TIME
MARKOV CHAIN	CONTINUOUS MARKOV CHAINS	STOCHASTIC DIFFERENTIAL EQUATION



PARAMETRIC HETEROGENEITY