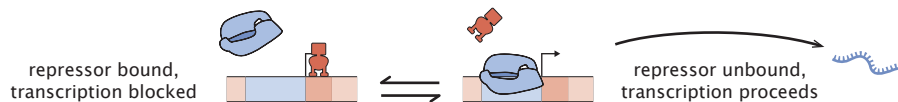


(A)

CANONICAL TRANSCRIPTIONAL REGULATION CARTOON



RNA polymerase



transcriptional repressor

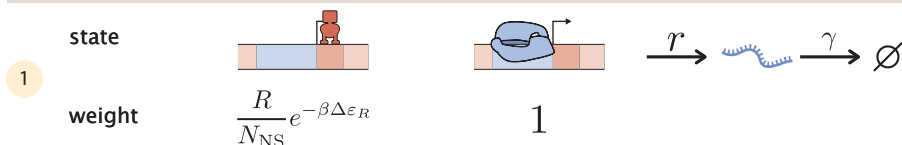


DNA promoter

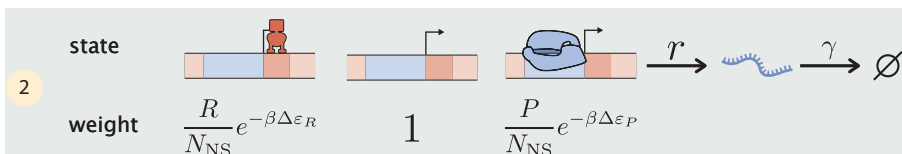
(B)

EQUILIBRIUM MODELS

DETAILS OF PROMOTER MODELS



$$\rho = 1$$

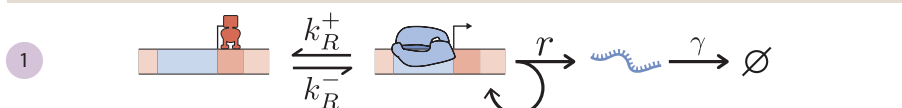


$$\rho = 1 + \frac{P}{N_{NS}} e^{-\beta \Delta \varepsilon_P}$$

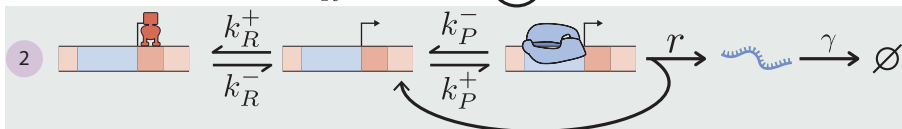
(C)

NONEQUILIBRIUM MODELS

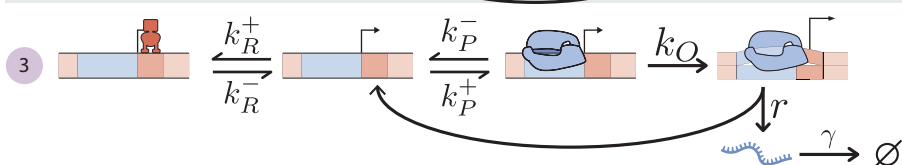
DETAILS OF PROMOTER MODELS



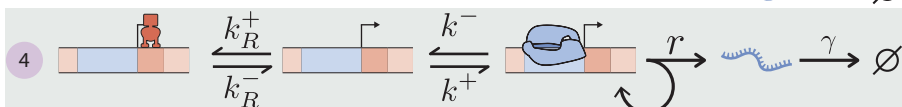
$$\rho = 1$$



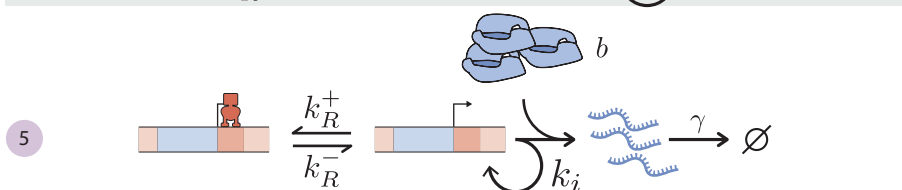
$$\rho = 1 + \frac{k_P^+}{k_P^- + r}$$



$$\rho = 1 + \frac{k_P^+(k_O + r)}{r(k_P^- + k_O)}$$



$$\rho = 1 + \frac{k_P^+}{k_P^-}$$



$$\rho = 1$$

(D)

THE MASTER CURVE FOR SIMPLE REPRESSION

$$\text{fold-change} = (1 + \exp(-\Delta F_R + \log(\rho)))^{-1}$$

$$\Delta F_R = \beta \Delta \varepsilon_R - \log \left(\frac{R}{N_{NS}} \right) \quad (\text{equilibrium})$$

$$\Delta F_R = -\log \left(\frac{k_R^+}{k_R^-} \right) \quad (\text{nonequilibrium})$$

