$$\textit{Given an observed response sequence } Y_k^{(t)}, \textit{ and simulated } \Lambda_{\langle\varepsilon,n_c,\gamma_{CS}\rangle}:$$

$$\mathfrak{L}\left(\Lambda_{\langle\varepsilon,n_c,\gamma_{CS}\rangle}\|Y_k^{(t)}\right)=\prod_{t=1}^{|Y^{(t)}|} f\left(Y_k^{(t)}\|\Lambda_{\langle\varepsilon,n_c,\gamma_{CS}\rangle}\right)$$

$$let\quad\begin{cases} N &= 40\\ \varepsilon &= -.5,\ldots,.5\\ n_c &= 10,\ldots,30\\ \gamma_{CS} &= 0,\ldots,1\\ \Lambda_{\langle\varepsilon,n_c,\gamma_{CS}\rangle} &= \{\Phi,\Theta,\Pi\}\\ \\ \lambda_\pi^{(t=1)} &= P\left(\theta^{(t=1)}=\theta_\pi^{(t=1)}|Y_k^{(t=1)}\right)=\pi_i\\ \lambda_i^{(t)} &= P\left(\theta^{(t)}=\theta_i^{(t)}|Y_k^{(t)}\right)\\ \lambda_j^{(t+1)} &= P\left(\theta^{(t+1)}=\theta_j^{(t+1)}|Y_k^{(t+1)}\right)\end{cases}$$

$$\begin{aligned}&Assume:\\ &\quad\forall\ Y_k^{(t)}\in\{/bAk/,/dAk/\}:V(x,y)_{\langle\varepsilon,n_c,\gamma_{CS}\rangle}\vdash\lambda_{\pi ij}^{(t)}\ \therefore\\ &\quad\theta^{(t)}=\underset{\pi ij}{\arg\max}\ \lambda_{\pi ij}^{(t)}\end{aligned}$$

$$\textit{Then the Maximum Likelihood Estimate of the tuple } \langle\varepsilon,n_c,\gamma_{CS}\rangle \textit{ given } Y_k^{(t)} \textit{ is defined as}:$$

$$\begin{aligned}\mathfrak{L}\left(\Lambda_{\langle\varepsilon,n_c,\gamma_{CS}\rangle}\|Y_k^{(1)},,Y_k^{(N)}\right)&=\prod_{m=1}^{N-1}\prod_{n=2}^{N}\left(\phi_{\lambda_j^{(m)}\to\lambda_j^{(n)}}\ \theta_{\lambda_j}^{(n)}\ \pi_i\right)\\ \ln\ \mathfrak{L}\left(\Lambda_{\langle\varepsilon,n_c,\gamma_{CS}\rangle}\|Y_k^{(1)},,Y_k^{(N)}\right)&=\sum_{m=1}^{N-1}\sum_{n=2}^{N}\ln\ \left(\phi_{\lambda_j^{(m)}\to\lambda_j^{(n)}}\ \theta_{\lambda_j}^{(n)}\ \pi_i\right)\ \therefore\\ \langle\varepsilon,n_c,\gamma_{CS}\rangle_{MLE}&=\underset{\varepsilon,n_c,\gamma_{CS}}{\arg\max}\ \ln\ \mathfrak{L}\left(\Lambda_{\langle\varepsilon,n_c,\gamma_{CS}\rangle}\|Y_k^{(1)},,Y_k^{(N)}\right)\\ \langle\varepsilon,n_c,\gamma_{CS}\rangle_{MLE}&=\underset{\varepsilon,n_c,\gamma_{CS}}{\arg\max}\sum_{n=1}^{N}\ \ln\ P\left(Y_k^{(1)},,Y_k^{(N)}|\Lambda_{\langle\varepsilon,n_c,\gamma_{CS}\rangle}\right)\end{aligned}$$

Box 5.2. Definition of the Maximum Likelihood Estimator used to estimate parameters ε and γ_{CS} of the 2D potential model for each observed experimental trial sequence. See text for details.