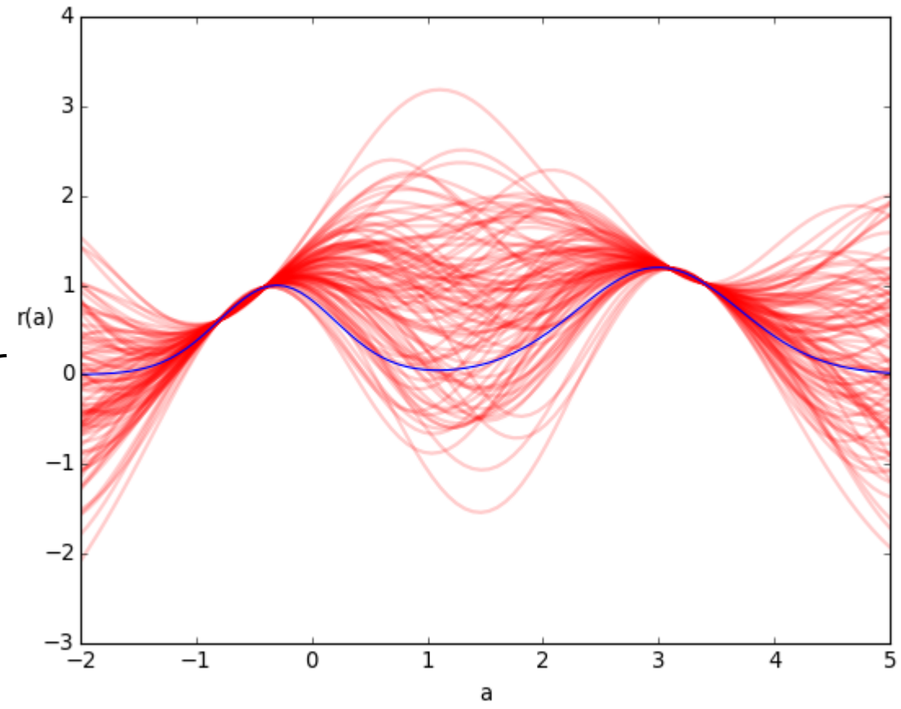


High information gain

High value

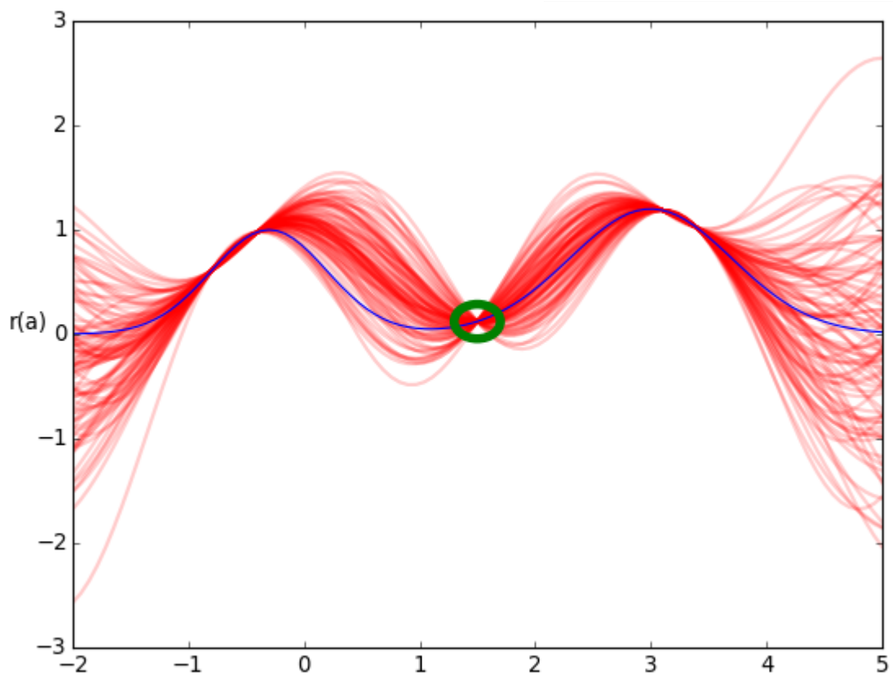
Choose a new action

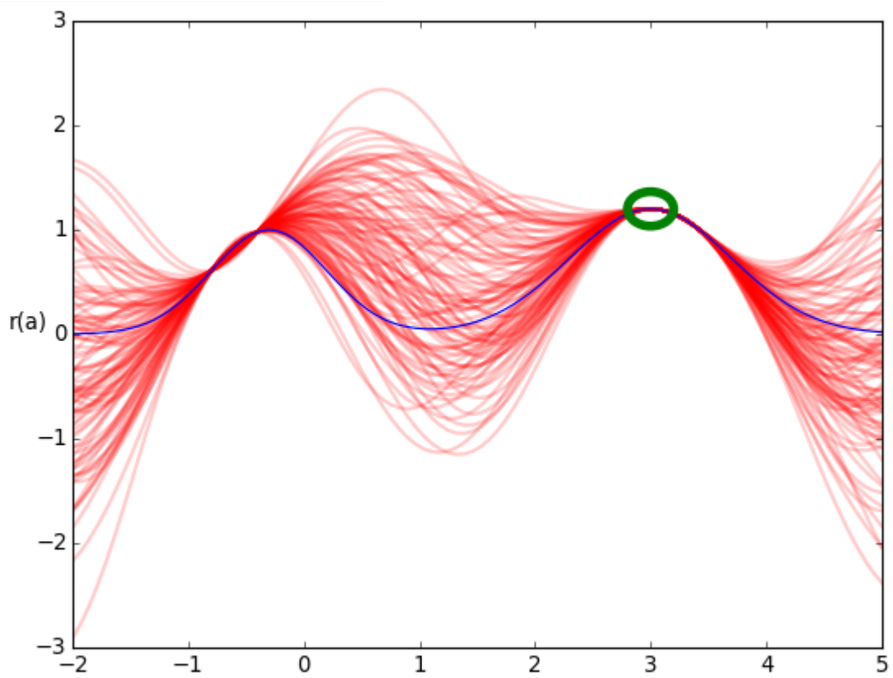
$$\tau_{\text{search}}: \qquad E\left(a' \,\middle|\, a\right) = -\frac{1}{s}\left(\widehat{\mu}(a') - \widehat{\mu}(a)\right)$$

$$\widehat{\mu}(a) = \frac{1}{N_{\text{MC}}} \sum_{i=1}^{N_{\text{MC}}} \widetilde{r}_{i,a}$$

$$\widetilde{r}_{i,a} \sim \mathcal{N}\left(\mu(a), K(a,a) \,\middle|\, \sigma, \ell, \mathbf{a}_{\text{past}}, \mathbf{r}_{\text{past}}\right) \text{ i.i.d.}$$

$$Q_{\text{proposal}}\left(a' \,\middle|\, a\right) \sim \mathcal{N}(a, \texttt{propstd}^2)$$





Update parameters

τ_{update} :

True posterior

$$P\left(\sigma, \ell \,|\, \mathbf{a}_{\text{past}}, \mathbf{r}_{\text{past}}\right) \propto \exp\left(-\frac{1}{2}\mathbf{r}_{\text{past}}^T K_{\text{prior}}(\mathbf{a}_{\text{past}}, \mathbf{a}_{\text{past}})^{-1}\mathbf{r}_{\text{past}}\right)$$

MH proposals

$$Q_{\text{proposal}}\left(\sigma', \ell \,\middle|\, \sigma, \ell\right) \sim P(\sigma')$$

$$Q_{\text{proposal}}\left(\sigma, \ell' \,\middle|\, \sigma, \ell\right) \sim P(\ell')$$

$$P_{\text{accept}}\left(\sigma', \ell' \,\middle|\, \sigma, \ell, \mathbf{a}_{\text{past}}, \mathbf{r}_{\text{past}}\right) = \frac{P(\sigma)P(\ell)}{P(\sigma')P(\ell')} \exp\Bigg(-\frac{1}{2}\Bigg(\mathbf{r}_{\text{past}}^T K_{\text{prior}}\left(\mathbf{a}_{\text{past}}, \mathbf{a}_{\text{past}} \,\middle|\, \sigma', \ell'\right)^{-1}\mathbf{r}_{\text{past}} - \mathbf{r}_{\text{past}}^T K_{\text{prior}}\left(\mathbf{a}_{\text{past}}, \mathbf{a}_{\text{past}} \,|\, \sigma, \ell\right)^{-1}\mathbf{r}_{\text{past}}\Bigg)\Bigg)$$

$$K_{\text{prior}}(\mathbf{a}_{\text{past}}, \mathbf{a}_{\text{past}}) = \left[\sigma^2 \exp\left(-\tfrac{(a_1 - a_2)^2}{2\ell}\right)\right]_{a_1, a_2 \in \mathbf{a}_{\text{past}}}$$