LCBSC

Lower Confidence Bound Selection Criteria for minimizing the distance

- Selecting the query point for round t is a two part process. First optimise LCBSC

$$\theta^* = \arg\min_{\theta} \mu_{1:t}(\theta) - \sqrt{\eta_t^2 v_{1:t}(\theta)} \quad , \quad \eta_t^2 = 2 \cdot \log\left(\frac{t^{2 \cdot d+2} \pi^2}{3 \cdot \xi_\eta}\right)$$

- Then sample the next query point from truncated Gaussian

$$\theta_{t+1} \sim \mathrm{TN}(\theta^*, \Sigma_{\mathrm{acq}}, \Omega)$$

- where Σ_{acq} and Ω are a tunable parameter balancing exploration/explotation and the optimization region, respectively

MaxVar

The maximum variance acquisition method

- The next evaluation point is acquired where the variance of the unnormalised approximate posterior is maximised

$$\theta_{t+1} = \arg\max_{\theta} \text{Var}(p(\theta) \cdot p_a(\theta))$$

$$p_a(\theta) = \Phi\left(\frac{\epsilon - \mu_{1:t}(\theta)}{\sqrt{v_{1:t}(\theta) + \sigma_n^2}}\right)$$

- ϵ is the ABC threshold, $\mu_{1:t}$ and $v_{1:t}$ are determined by the GP surrogate, σ_n^2 is the noise.