ExpIntVar

The Expected Integrated Variance

- Loss function measures the overall uncertainty in the unnormalised ABC posterior over the parameter space.
- The value of the loss function depends on the next simulation so the next evaluation location θ^* is chosen to minimise the expected loss

$$\theta_{t+1} = \arg\min_{\theta^*} L_{1:t}(\theta^*)$$

- The expected loss $L(\cdot)$ approximated as:

$$L_{1:t}(\theta^*) \approx 2 \cdot \sum_{i=1}^{s} \omega^i \cdot p^2(\theta^i) \cdot w_{1:t+1}(\theta^i, \theta^*)$$

- ω^i is an importance weight, $p^2(\theta^i)$ is the prior squared, and $w_{1:t+1}(\theta^i, \theta^*)$ is the expected variance of the unnormalised ABC posterior at θ^i after running the simulation model with parameter θ^*

Sampling from surrogate

- To represent the posterior distribution we require a set of samples drawn from it
- ABC methods produce an approximate sample from the posterior
- Surrogate methods provide an approximate posterior curve
- We use MCMC methods to draw a posterior sample