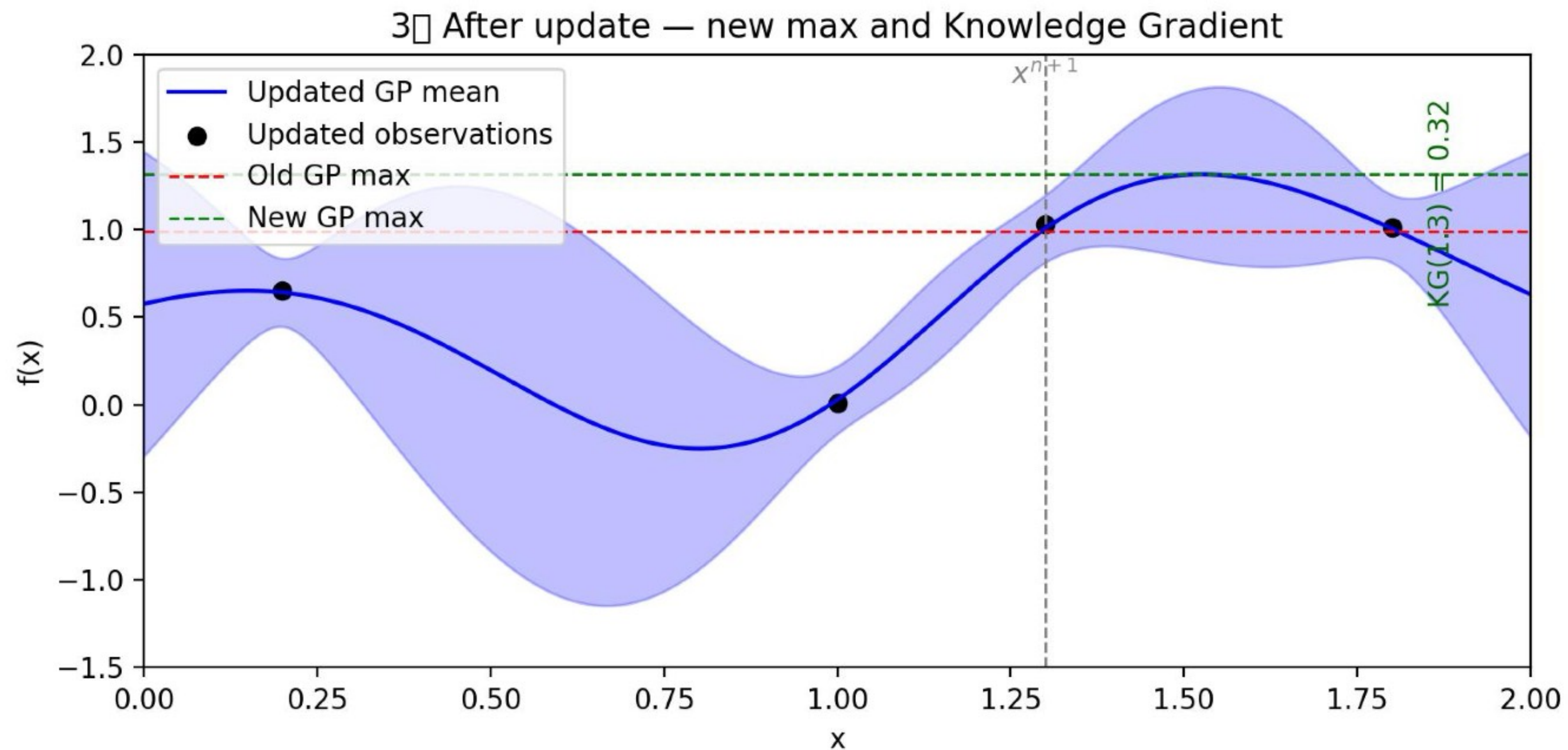


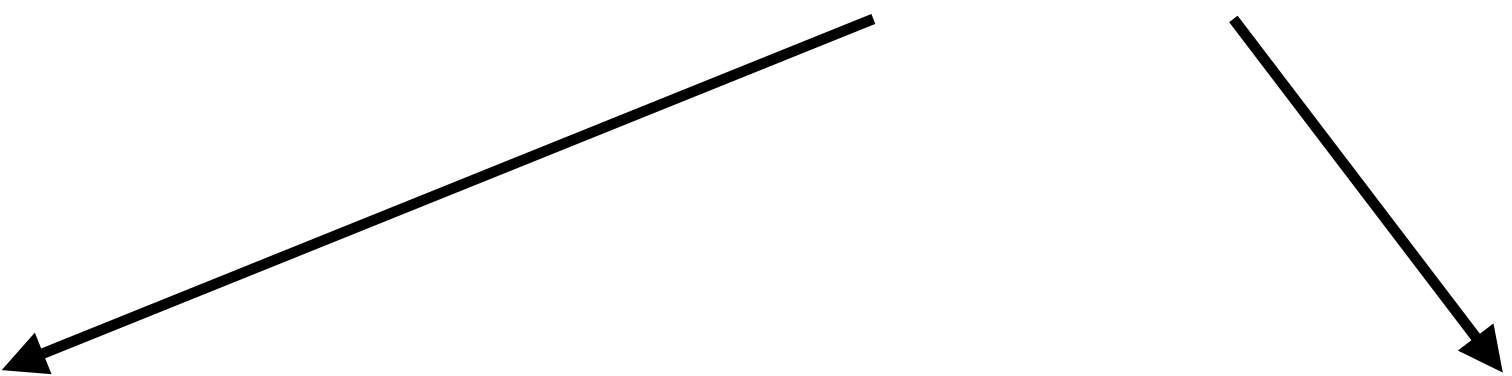
Monte Carlo Sampling - 3

WuandFrazier2017



Reparameterization Trick

Reparameterization expresses the new GP mean with the included x^{n+1} data point $\mu_y^{n+1}(x)$ using the old GP mean $\mu_y^n(x)$

$$\mu_y^{n+1}(x) = \mu_y^n(x) + \tilde{\sigma}_y^n(x, x^{n+1}) Z_y, \quad Z_y \sim \mathcal{N}(0,1),$$
Two arrows originate from the equation above. One arrow points from the term $\mu_y^n(x)$ down to the text 'Reparameterized covariance coefficient of x, x^{n+1}'. The other arrow points from the term Z_y down to the text 'Introduces randomness to GP posterior sampling'.

Reparameterized covariance coefficient of x, x^{n+1}

$$\tilde{\sigma}_y^n(x, x^{n+1}) = \frac{k_y^n(x, x^{n+1})}{\sqrt{k_y^n(x^{n+1}, x^{n+1}) + \sigma_\epsilon^2}}$$

Introduces randomness to GP posterior sampling

Notice the new posterior mean is a linear function of Z_y