CSE 515T (Fall 2024) Assignment 3
Due Wednesday, 13 November 2024

1. Replicate figure 2.1 in the Bayesian optimization book (bayesoptbook.com) from scratch in an environment such as Python, R, or Julia. I will post hints to slack. This should require less than 100 lines of code.

2. Replicate figure 2.2 in the Bayesian optimization book (bayesoptbook.com) from scratch in an environment such as Python, R, or Julia. I will post hints to slack. This should require less than 100 lines of code.

3. Replicate figure 2.3 in the Bayesian optimization book (bayesoptbook.com) from scratch in an environment such as Python, R, or Julia. I will post hints to slack. This should require less than 100 lines of code.

4. Consider a Gaussian process on $f \colon \mathbb{R}^d \to \mathbb{R}$, $p(f) = \mathcal{GP}(f; \mu, K)$. Suppose μ and K are differentiable with respect to their inputs. Consider the ith partial derivative of f at some point x:
$$f_i' = \frac{\partial f}{\partial x_i}(x).$$

Show that f_i' has a Gaussian distribution. What is its mean and variance? Hint: work from the definition of the partial derivative and use the fact that a limiting sequence of Gaussian distributions is Gaussian.