# Notes on Bayesian Optimization for Multi-Objective Optimization

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## Overview of Bayesian Optimization in Single- and Multi- Objective Optimization Problems

Mathematical Formulation:

We are considering the problem of finding a global maximizer (or minimizer) of an unknown objective function :

(1)

where is some design space of interest; In global optimization, is often a compact subset of but the Bayesian optimization framework can be applied to diverse search spaces which involve categorical or conditional inputs or even combinatorial search spaces with multiple categorical inputs.

Furthermore, we will assume that the unknown aka *blackbox* function has no simple closed form, but it can be evaluated at any arbitrary query point in the domain . This evaluation produces noise-corrupted (stochastic) outputs such that . In other words, we can only observe the function through unbiased noisy point-wise observations .

# Bibliography

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