Thesis Working Whitepaper

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1 Definition

Here I'll record the formal definition of the EGO algorithm, especially all of the equations involved.

1.1 Likelihood

The likelihood of a model is given by the equation,

$$\frac{1}{(2\pi\sigma^2)^{n/2}|\mathbf{R}|^{\frac{1}{2}}}\,exp\left[-\frac{(\mathbf{y}-\mathbf{1}\mu)'\mathbf{R}^{-1}(\mathbf{y}-\mathbf{1}\mu)}{2\sigma^2}\right] \tag{1}$$

Where the best estimates of μ, σ^2 are,

$$\hat{\mu} = \frac{\mathbf{1}'\mathbf{R}^{-1}\mathbf{y}}{\mathbf{1}'\mathbf{R}^{-1}\mathbf{1}}, \tag{2}$$

and,

$$\hat{\sigma}^2 = \frac{(\mathbf{y}-\mathbf{1}\hat{\mu})'\mathbf{R}^{-1}(\mathbf{y}-\mathbf{1}\hat{\mu})}{n}. \tag{3}$$

1.2 Predictor

The best linear unbiased predictor of the function's output at $\mathbf{x}^*$ is,

$$\hat{y}(\mathbf{x}^*) = \hat{\mu} + \mathbf{r}'\mathbf{R}^{-1}(\mathbf{y}-\mathbf{1}\mu) \tag{4}$$