KPLS: from non-Bayesian to Bayesian

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Presentation

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KPLS (Kriging using Partial Least Squares)

Reference article:

- Title: Improving Kriging surrogates of high-dimensional design models by Partial Least Squares dimension reduction
- Authors: Mohamed Amine Bouhlel, Nathalie Bartoli, Abdelkader Otsmane, Joseph Morlier
- Date: 2015

$\longrightarrow$ Main contribution = use of PLS to reduce the number of hyper-parameters
$\longrightarrow$ Underlying theory is fully **frequentist**

Experiments

Introducing $\Delta = (\mathbf{y} - \mathbf{F}\boldsymbol{\beta})^\top \mathbf{R}^{-1} (\mathbf{y} - \mathbf{F}\boldsymbol{\beta})$, we have:

$$\hat{\sigma}^2_{MP} = \frac{2\delta + \Delta}{2(\alpha - 1) + n} \quad \text{and} \quad \hat{\sigma}^2_{MAP} = \frac{2\delta + \Delta}{2(\alpha + 1) + n}$$

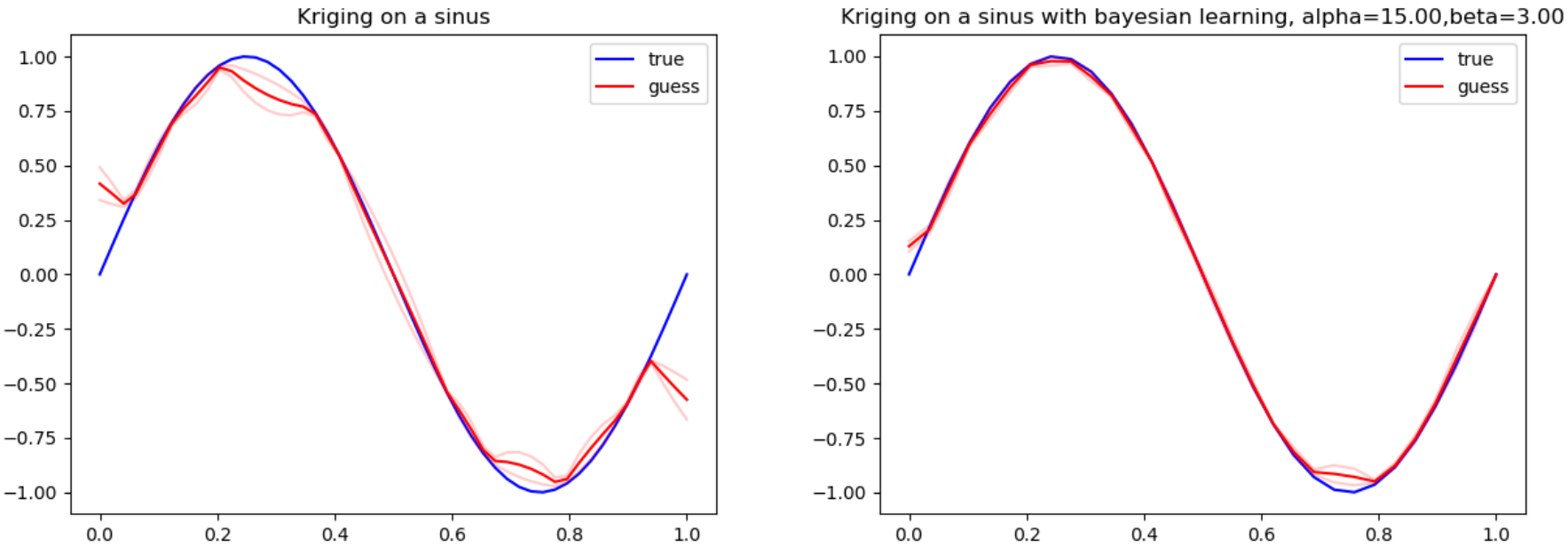

Figure: Example where $n = 13$ points