

# Reconstruction of High Dimensional Functions from Irregularly Spaced and Error Afflicted Samples by Kriging

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Interpolation is generally used for constructing new data points from known samples of an underlying unknown function. The majority of interpolation methods, in particular in higher dimensions, require the known data points to be placed on some equidistant grid. However, it is a common situation to have only certain measurements at irregular spaced positions available that are additionally afflicted with measurement errors. Kriging, a class of linear least square estimators that is named after Daniel Gerhardus Krige and was first applied in geostatistics is very well suited for such situations. The presented ordinary Kriging approach is the most popular and commonly used Kriging method because of its effectiveness and simplicity.

Ordinary Kriging is also suitable for a wide range of optimization problems, in particular where derivatives are not available and further function evaluations are expensive and/or time-consuming. Moreover, the error variance that can be easily calculated is often very important. Ordinary Kriging is the basis for many other Kriging variants that modify certain ideas to meet more specific requirements. We present the basic Kriging approach together with selected applications from the field of biotechnology.