

Kriging a simple analytical function

With the *km()* function of DiceKriging package, build a simple kriging on the test function :

$$f(x) = \sin(30(x - 0.9)^4) \cos(2(x - 0.9)) + \frac{(x - 0.9)}{2},$$

with a design of experiments of 5 points equi-distributed [0,1]. Use a Gaussian covariance with parameters $\mu=0$ (mean), $\sigma^2=0.5$ (variance) and $\theta=0.2$ (range).

We follow the following steps:

- Definition of the test function,
- Building the design,
- Run the function on the design points,
- Plot the function and the design points,
- Definition of the kriging parameters,
- Building the kriging,
- Kriging predictions and plot the results (the mean and the confidence intervals at 95%) between 0 and 1 (use the option « SK » of function *predict()*),
- Study the influence of parameters μ, σ^2 and θ ,
- Increase the size of the design of experiments,
- Estimate the 0.95-quantile of the function output with :
 - the true function,
 - the kriging predictor,
 - conditional simulations (function *simulate()*),
- Give a 90%-confidence interval on the quantile estimated by conditional simulations.