

Christmas Workshop Energy Finance 2016 | December 12th – December 16th | Abstract

A sequential design for gas storage optimization using kriging

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Abstract:

Until lately, considerably less attention is paid to optimal switching problems using regression Monte Carlo methods. An area where this kind of problems arise frequently, is the valuation of operational flexibility of exotic energy derivatives such as power plants, swing options or gas storages. We want to introduce a new regression Monte Carlo algorithm to value gas storages. We reformulate the optimal control problem as a generalization of a multiple stopping problem, which boils down to a classification problem of ranked value functions. Moreover we want to take the cost of sampling and regression into consideration by adopting sequential space-filling designs. Ludkovski (2016) exposes the benefits of stochastic kriging as a flexible, nonparametric regression approach in the light of sequential sampling, which will be utilized to estimate the value function. The benefit of that framework is the smart sampling of highly complex value functions, where a priori little is known about the exact decision boundaries, i.e. the intersections of the value functions, and the efficient updating of the regression.