

## **A multiple points Infill sampling criteria based on Kriging meta model**

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### **Abstract**

The EGO method has been widely used to solve the "expensive to evaluate" optimization problem. In the serial optimization process, one new point is selected based on single point infill sampling criteria, which is meant to balance searching the optimum and improving the accuracy of the surrogate. To accelerate the optimization process with parallel computing technique, multi new points should be generated during each step-loop and evaluated with multi processors. This paper introduces a multi points infill sampling criteria named EI&MI, which is mainly formed by the classic single point infill sampling criteria "expected improvement" and the "mutual information" between the multi points. The mutual information measures the information shared by the multi points. It can be calculated based on the entropy, the entropy can be calculated by the Kriging surrogate and used to measure the uncertainty of the surrogate. The key idea of the EI&MI is about to balance searching the optimum and improving the accuracy of the surrogate with multi new points. In this paper, EI&MI has been compared to some other multi points infill sampling criterion with some mathematical functions, and the results show that the EI&MI is more suitable to be used for the larger scale parallel computing.