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Combined response surface method with adaptive sampling for expensive black-box global optimization. (Chinese. English summary) Zbl 07404507


Summary: A combined response surface method is presented for expensive black-box global optimization, which can adaptively take sampling points during iterations. Under the framework of response surface method, the convex combination of the cubic radial basis function and the thin plate spline radial basis function is adopted as the response surface. In the initial phase of the algorithm, the global optimizer of the auxiliary function formed by the product of the response surface model and the power of the distance indicator function will be taken as the new sample point. In the following iterations, if the distance between the two response surface models of the two consecutive iterations is smaller than a given threshold, then the global optimizer of the current response surface model will be taken as the next sample point, otherwise the sampling strategy of the initial phase will be adopted. The effectiveness of the proposed algorithm is demonstrated by the results of the numerical experiments carried respectively on 7 standard test problems and 22 standard test problems.

MSC:

90C26 Nonconvex programming, global optimization

Keywords:

black-box function; global optimization; response surface method; radial basis function

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