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## Structural reliability analysis based on a multiple sub-region surrogate model

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**Abstract:** A multiple surrogate model is constructed based on the concept of reasonable sub-region in this study. The classical response surface model is used inside of the reasonable sub-region, and the classical Kriging model is used outside of the reasonable sub-region. The multiple-surrogate model can make full use of the advantages of both classical models, reasonably avoid the reliability evaluation risk brought by the assumed response function in the classical response surface model, and effectively avoid the problem of combination explosion of experiment points in the classical Kriging model. Compared with the classical response surface model, the number of experiment points constructed the multiple-Kriging model surrogate model does not increase, and thus the computational efficiency is roughly the same as that of the classical response surface model. The numerical results indicated that the proposed method has the similar accuracy as Monte Carlo simulation, and thus is satisfactory.

**Key words:** structural reliability; surrogate model; reasonable sub-region; classical response surface; Kriging

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