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Thermal Bending of Circular Plates for Non-axisymmetrical Problems

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Summary

Due to the complexity of thermal elastic problems, analytic solutions have been obtained only for some axisymmetrical problems and simply problems. Yu De-hao discussed bending problems of plates with the natural boundary element method. Using the above method, Li Shun-cai discussed the bending problems of solid circular plates] and bending deflections for annular infinite plates under the boundary loads.

On the basis of the same method, expanding the boundary slope into Fourier series, and using several convolution formulae, the boundary integral formula and natural boundary integral equation for the boundary value problems of thermal bending of Circular Plates are obtained.

For the thermal distribution functions on the surface of the plate, there are three conditions:

1 in the plate there is no heat source, the surface distribution density of the equivalent load is zero.

2 the heat sources are axisymmetrical.

In Example 1, the computation of this paper is according to the axisymmetrical solution

3 the heat sources are non-axisymmetrical.

In Example 2, the non-axisymmetrical solutions are given.

The formulas for the solutions have high convergence velocity and computational accuracy, and the calculating process is simpler. Examples show the discussed methods are effective.