

عنوان مقاله:

Optimal Shape Design for a Cooling Pin Fin Connection Profil

محل انتشار:

مجله کنترل و بهینه سازی در ریاضیات کاربردی، دوره 2، شماره 2 (سال: 1396)

تعداد صفحات اصل مقاله: 17

نویسندگان:

Seyed Hamed Hashemi Mehne - Assistant Professor of Aerospace Research Institute, Tehran, ۱۴۶۶۵-۸۳۴, Iran

Khodayar Javadi - Department of Aerospace Engineering, Sharif University of Technology

خلاصه مقاله:

A shape optimization problem of cooling fins for computer parts and integrated circuits is modeled and solved in this paper. The main purpose is to determine the shape of a two-dimensional pin fin, which leads to the maximum amount of removed heat. To do this, the shape optimization problem is defined as maximizing the norm of the Nusselt number distribution at the boundary of the pin fin's connection profile. The governing differential equations are solved in solid and fluid phases separately. In order to formulate the optimization problem with finite dimensions, the shapes of the profiles are parameterized with cubic polynomials. Due to the lack of an explicit relation between the objective function and the geometric parameters, an approximate modeling method is used for the optimization process. The proposed method starts with three initial points. Then, the governing differential equations are solved for each of the profiles related to the initial points. The new step in this iterative process involves calculations based on a polynomial interpolation within the resulting Nusselt number norms. A numerical example is given to show the implementation and accuracy of the method.

کلمات کلیدی:

Approximation, Heat Transfer, Optimization, Shape Optimization

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1605932>

