Sri Lanka Association for the Advancement of Science (SLAAS)
Proceedings of the 58th Annual Session, Part 1 – Abstracts of Presentations
02 December – 07 December, 2002. Colombo.

538 E1

A parametrised mesh generator for finite element sensitivity computation

S Krishnakumar[1] and S R H Hoole[2*]

[1] *Department of Computer Sciences, Faculty of Engineering, University of Peradeniya, Sri Lanka*
[2] *Department of Electrical and Electronic Engineering, Faculty of Engineering, University of Peradeniya.*

This paper presents a new parametrised mesh generator for sensitivity computation in finite element optimization. The generator allows repeated solutions with iterated meshes so that it can be employed in a first order optimization strategy exploiting its faster convergence rates.

It has been shown that of the various methods of optimization, gradients based methods are powerful. But in engineering design with finite element meshes, there are mesh-induced object function discontinuities that are seen as local minima and the optimization process fail.

A structural mapping method has been proposed in the past to overcome this problem but it requires a two-part solution, an artificial structural problem and then a real problem in the domain of the field, in our case the electromagnetic field as in designing electrical devices.

We detail a novel parametrically defined mesh that produces elastically deformed meshes preserving object function continuity and derivative continuity. The several types of the necessary parametric definitions are detailed to have a suite of algorithms that can handle any kind of optimization geometry.

This project was supported by the National Science Foundation (Sri Lanka) under Award No. RSP/2001/UOP/E/02, and Grant No. RG/2001/E/04 is acknowledged.

[1] *(On leave from the University of Jaffna, Vavuniya Campus)*
* hoole@cs.pdn.ac.lk Tel 08 388029