AN EFFICIENT ALGORITHM FOR

LOCALLY FITTED 3D MESH GENERATION

A PROJECT REPORT PRESENTED BY

SHIVASHAGTHY SANDRASEGARAM

to the Board of Study in Statistics & Computer Science of the

POSTGRADUATE INSTITUTE OF SCIENCE

in partial fulfillment of the requirement
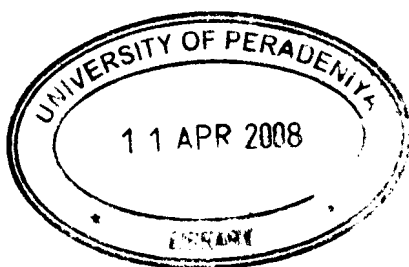*for the award of the degree of*

MASTER OF SCIENCE IN COMPUTER SCIENCE

of the

UNIVERSITY OF PERADENIYA
SRI LANKA
2007

AN EFFICIENT ALGORITHM FOR

LOCALLY FITTED 3D MESH GENERATION

Shivashagthy Sandrasegaram

Postgraduate Institute of Science

University of Peradeniya

Sri Lanka

Abstract

A key step of the finite element method for numerical computation is mesh generation. One is given a domain (such as a polyhedron; more realistic versions of the problem allow curved domain boundaries) and must partition it into simple "elements" meeting in well-defined ways. Locally fitting domain is a powerful idea leading to methods which trade the simplicity of mesh generation against difficulties with the boundary conditions. We develop an automated 3D mesh generator produces meshes locally fitted to the boundary. Major reductions in required storage for meshing have been obtained. The computational complexity of mesh generator is the O (n), where n denotes the number of mesh points. Therefore this technique is suited for generating rather fine grids, quite efficiently.