Geometry & Mesh Software Components for Scientific Computing

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10:00 AM, Research Office Building (5700), RM D307
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Abstract

The ITAPS SciDAC project is developing interfaces to geometry and mesh data for use by scientific computing codes. These interfaces, named iGeom and iMesh, are implemented by the CGM and MOAB components, respectively. CGM supports solid modeler- and facet-based geometry, and is currently being ported to the Open.Cascade open source modeling engine. The MOAB mesh library supports most finite element, difference, and volume mesh types, while also providing a data model flexible enough to store most types of simulation data. In this talk I will describe recent additions to MOAB which support parallel data loading and communication and support for spatial searching and ray firing on a mesh. Applications of these components will be described, including Monte Carlo radiation transport and finite element-based reactor simulation.XS