

GEOMODELING WITH GOCAD

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In spite of their success in modeling simple surfaces, automatic mapping systems and traditional CAD systems are unable to model complex geological surfaces and, volumes affected by severe tectonic events with overturned folds, salt domes and reverse faults. For this reason, within the framework of the gOcad research project, a new discrete modeling approach was proposed where, for any object to be modeled:-the geometry is defined by a finite set of nodes in the 3D space,-the topology is modeled by links bridging these nodes,-the physical properties are modeled as values attached to these nodes.

In practice, such a discrete approach is of no interest without a powerful mathematical tool able to interpolate the physical properties and the location (x,y,z) of the nodes defining the objects in the 3D space. For this reason, a very powerful new method, called Discrete Smooth Interpolation (DSI) was proposed which today is at the very heart of the gOcad research project. This new interpolation method was specially designed for modeling natural objects, while taking into account a wide range of complex and more, or less, precise data. This paper presents a review of the most important concepts which constitute the backbone of the gOcad project.