EarthVision® 7.5

Cellular Gridder

ev_cellg

The EarthVision® **Cellular Gridding** module converts an EarthVision faulted structure or property model into a cellular-grid format compatible for input to reservoir upscaling and simulation programs. Using an algorithm optimized for faults, the EarthVision **Cellular Gridding** program calculates cellular reservoir grids that accurately portray the structure and/or property in the original 3D model. The cellular 3D grid then provides the framework for calculating and predicting the flow of fluids within the reservoir. Unlike an EarthVision 3D grid, which has all of its grid lines parallel and orthogonal (thereby usually crossing structural and property features), a cellular grid is created so that its grid lines align to the major structural components of the model such as the faults and horizons.

In addition to the non-orthogonal nature of a cellular 3D grid, the property within each grid cell is cell centered. The grid cells need not have rectangular sides; nor must they be the same size throughout the cellular grid. (In EarthVision 3D grids, the grid cells must all be the same size in X and Y; the sides of the grid cells must be either squares or rectangles; and the property is node-centered, i.e., it is defined at each corner point of the cell.) The method used for creating EarthVision cellular grids decreases the loss of information between the structural-modeling and reservoir-simulation processes; thus the geocellular grids appropriately reflect the modeled geologic features.

An EarthVision cellular 3D grid file can be interactively displayed and examined in EarthVision's **Cellular Viewer**; when creating the cellular grid, the general trend of the three major planes can be set interactively against the 3D EarthVision geologic model, also using the **Cellular Viewer**. Defining the planes while visualizing the 3D model allows for a more accurate representation of the model in the cellular grid. Once the results are satisfactory, the cellular grid can be exported to different simulator input formats such as Eclipse™, VIP CORP™, CMG™, FGRID Eclipse™, GRIDGENR™, and/or RESCUE™ format, then passed on for simulation.

Specifications

- converts an EarthVision faulted structure or property model into a cellular grid format compatible for input to reservoir upscaling and simulation programs
- industry-quality upscaling is available at the script level (currently); all other features are available within the graphical user interface (GUI)
- algorithm optimized for faults and must be used with a faulted model
- cellular grid planes (*i*, *j*, and *k*) need not be orthogonal; however, orthogonality of the initial volume is easily maintained and the final grid is deformed appropriately to fit the structural model
- spacing between *i*, *j*, and *k* planes can vary throughout the cellular grid
- grid planes can be aligned to the major structural components of the model such as the faults and horizons
- properties are cell centered; property value remains constant within a given grid cell
- grid nodes can be split so that a single node can be on opposite sides of a fault
- *i*-plane, *j*-plane, and *k*-planes can be user-entered via a table or interactively set in 3D using the **Cellular Viewer**
- cellular grid resolution and cell size are user-controlled
- variably spaced cellular grids (similar to a tartan pattern) are supported and are defined graphically
- local grid refinement is supported and is specified graphically
- local grids can be specified within other local grids
- each local grid can have a unique variable spacing and refinement
- output cellular grids can be limited to a smaller region of interest than that of the input model
- output cellular grids can cover a larger volume than the geologic model
- output grids are quality-checked and adjusted for negative, small, and wedge-shaped cells
- antithetic, λ (lambda-shaped), and reverse faults are supported
- individual faults can be specified as having the cells along an *i* plane, *j* plane, or *ij* plane aligned conformal to the fault, or the cells can be specified to "stair step" along the fault
- at least one fault must align with the *i*, *j*, or *ij* plane to establish the grid orientation
- faults can be verticalized to an existing grid line
- output *k* layers are mapped to the geologic layers in the structural model
- *k* layers can be conformal to any top, bottom, or both horizon surfaces, to neither, or to any external 2D grid surface, and can also be specified via thicknesses
- rows and/or columns of cellular grid cells can be trimmed when creating the cellular 3D grid
- cellular grid can be cut by a polygon in a "cookie cutter" fashion
- cellular grids can be interactively displayed and examined in EarthVision's **Cellular Viewer**
- cellular grid can be exported to different simulator input formats (see *Output Data*)
- grid reports can be calculated that include the cellular grid resolution, projection information, units, range, *k* layer attributes, and cell attributes

- parameter files allow the GUI information to be saved and reused quickly and easily

Input Data

- sequence file and associated files (2D and 3D surfaces, property data file(s), etc.) depicting the input geologic model
- 2D grid(s) to which the cellular grid space can be conformed (optional)
- structural surfaces (as defined in a sequence file by the appropriate 2D grids) as the top and/or bottom conformal surface(s) to which the cellular grid *k* layers can be conformed (optional)
- polygon file to laterally clip the cellular grid (optional)

Output Data

- project file containing all the cellular gridding parameters
- specification files containing parameters regarding the model area, geometry, and geology
- cellular 3D grid depicting fault blocks, zones, and/or properties of the input model
- Eclipse format grid (GRDECL)
- VIP CORP format grid
- CMG format grid (INC)
- FGRID Eclipse format grid
- GRIDGENR Text Format (GTF) grid
- RESCUE format grid

User Interface

- Graphical user interface
- Interface can be bypassed by running the underlying computations from a script file

Online Help/Documentation Features

- Online help is available from the graphical user interface, and manual pages at the system prompt
- Complete user documentation

This Module is an Option to

- 2D Surface and 3D Property Modeling System
- Geologic Modeling System
- Petroleum Suite
- Environmental Suite

The Cellular Gridding module is not included in any other EarthVision module licenses. A site must have an `ev_cellg` (or `ev_cellg_win` or `ev_cellg_net`) license in order to run the **Cellular Gridding** module.

For more information on this system or for hardware and third party software requirements, please contact your Dynamic Graphics representative.

DYNAMIC GRAPHICS, INC.®

Headquarters

Dynamic Graphics, Inc.
1015 Atlantic Avenue
Alameda, CA 94501-1154
1-510-522-0700
1-510-522-5670 fax
info@dgi.com
www.dgi.com

Offices and Representatives

Bakersfield 1.661.204.3016
Houston 1.713.952.2611
London 44.118.977.4755
Aberdeen 44.1339.889219
Paris 33.1.47.49.82.00
S.E. Asia 1.510.522.0700
South America 1.510.522.0700
Tokyo 813.5214.8647