

EarthVision® 7.5

Geostatistics

ev_gs



The EarthVision Geostatistics module provides 2D and 3D statistical methods for computing grid nodes based on 2D or 3D data. Geostatistics provides a way to add knowledge about the geology of a petroleum reservoir, aquifer, etc. to the modeling process that may not be reflected in the input data. Extensive pre-gridding data analysis capabilities help the EarthVision user optimize variogram model preparation prior to the kriging calculation. Variance grids can be calculated simultaneously with the estimate grid.

Specifications

The geostatistics model is integrated with the advanced structure models calculated using the EarthVision Geologic Structure Builder. For example, geostatistical models can be calculated conformal or nonconformal to structure, in selected zones and selected fault blocks.

- The following kriging algorithms¹ are included:
 - simple kriging
 - ordinary kriging
 - non-stationary kriging
 - kriging with external drift
 - kriging with a trend (universal kriging)
 - collocated cokriging
- Various tools are provided to allow examination of the statistics prior to modeling:
 - sample count (number)
 - minimum and maximum value
 - first and third quartiles
 - mean
 - median
 - variance
 - standard deviation
 - scatterplots
 - quantile graphs
 - histograms
 - probability plots
 - *p-p* and *q-q* plots
 - declustering tools
- The spatial relationships of the data to be kriged can be analyzed using the following variograms and variogram maps:
 - traditional semivariogram
 - covariance
 - correlogram
 - general relative
 - pairwise relative
 - logarithmic
 - rodogram
 - madogram
- *h*-scatterplots can also be generated for points within the variograms types listed above.
- A graphical variogram model viewer is included that helps to visualize and analyze the variogram model fit to the input 2D and 3D data.
- An unlimited number of structures can be used to model the variogram when fitting a curve, giving greater control in modeling complex spatial correlations.
- The following functions can be used in each structure:
 - power
 - gaussian
 - spherical
 - exponential
- A search radius for values to be used in a node estimate can be specified.
- The minimum/maximum number of neighboring values included in the grid node calculation can be defined.
- Visual tools for parameter analysis are included:
 - search pilots graphically display the search limits specified along with the 2D or 3D data being used
 - lag pilots graphically display the lag divisions along with the 2D or 3D data being used

Input Data

- tab-, comma-, or white-space-delimited free-format and fixed-format 2D and 3D ASCII scattered data

Output Data

- EarthVision 2D estimate and variance grids
- EarthVision 3D estimate and variance grids
- cross validation files
- variogram data files
- variogram model files

Other Information

Program Limits

ev_gs:

- 2,000,000 input data points
- 1024 x 1024 maximum 2D grid size
- 10,000,000 3D grid nodes

Limits when part of ev_env²:

- 50,000 input data points
- 512 x 512 maximum 2D grid size
- 500,000 3D grid nodes

User Interface

- graphical interface
- interface can be bypassed by running the underlying computations from a script file

1. Point or block kriging can be used with each of these algorithms.

2. A limited version of Geostatistics is shipped with the Environmental Suite license.

Online Help and Documentation

- 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 Modeling System
- 3D Property Modeling System
- 2D Surface and 3D Property Modeling System
- Geologic Modeling System
- Petroleum Suite
- Environmental Suite¹

For more information on these systems or for hardware and third party software requirements, please contact your Dynamic Graphics representative, or visit www.dgi.com.

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1. Ordinary kriging, variography, histogram, and quantile graph capabilities from this module are included in the Environmental Suite. The remainder of capabilities are available as an extra-cost option.