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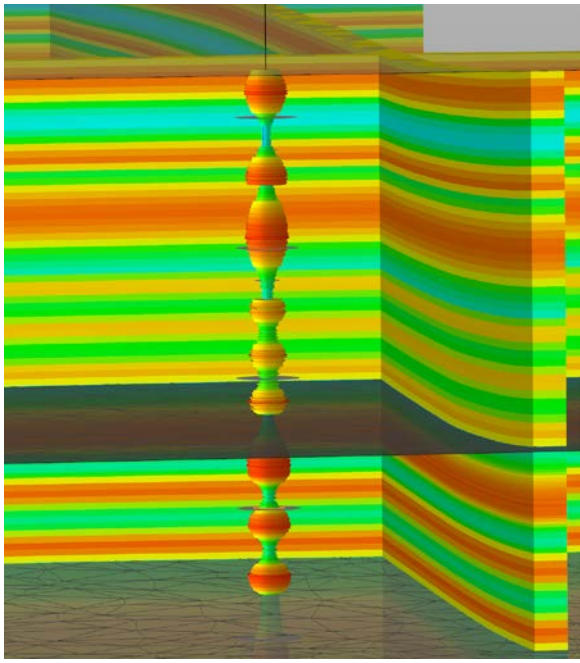
JewelSuite Geomechanics Application



JewelSuite software delivers subsurface intelligence and insight through a portfolio of applications focused on geological modeling, geomechanics, reservoir simulation and visualization to optimize field development plans and drive greater production. From 1D well-centric models to static full-field 3D models, the JewelSuite™ GeoMechanics application gives you greater insight into geomechanical risks to optimize the performance of your wells and reservoirs.

Integrated geomechanics

The modular design of JewelSuite GeoMechanics offers more flexibility. You can use the modules within JewelSuite GeoMechanics as standalone applications or in combination with other modules for an advanced, integrated geomechanical workflow. The full suite of modules includes 1D Model, Wellbore Stability, 3D Model and Fault and Fracture Stability.

Real-time analysis

The JewelSuite Geomechanics application enables access to real-time wellsite information transfer standard markup language (WITSML) drilling data offering flexibility to connect to a remote WITSML server to download and upload WITSML data, or use local WITSML files to import and export WITSML data.

Flexibility, connectivity, and extensibility

The JewelSuite Geomechanics application is built on the JewelEarth™ development platform that enables you to easily enhance existing functionality with new plug-ins or modules that contain your own algorithms or methodology; build your own workflow standards through set workflow panels; and connect to proprietary databases or other subsurface applications by using the JewelEarth Software Development Kit (SDK).

From 1D well-centric models to 3D reservoir analysis

- Identify geomechanical and drilling risks along with geologic hazards
- Mitigate abnormal pressure-related well control issues and proactively defines safe operating windows to reduce pressure-related NPT
- Perform uncertainty assessment to identify highest risk scenarios

Intuitive workflows lead users step-by-step through processes.

Workflows	
1D model	
Lithology modeling	• Define and characterize the different rock layers along the well
Overburden stress	• Calculate vertical stress from density data
Pore pressure	• Estimate pore pressure using compaction trends analysis, Bowers method and Sigma Log methods • Calculate fracture gradient
Horizontal stress	• Calculate minimum and maximum horizontal stresses using effective stresses ratio, stress contrast or SHmax Equilibrium Ratio methods
Depletion/Injection	• Calculate the pressure changes induced by the depletion and injection processes
Wellbore stability	
Check mud weight	• Evaluate the proposed or used mud weight by predicting the degree of wellbore failure along the well trajectory with the given stress state and rock properties and displaying the results
Predict mud weight	• Calculate the critical mud pressures that correspond to wellbore collapse, initiation of tensile fractures, and fracture link-up to propose optimal program of casing setting depths
3D model	
Data preparation	• Organize, create, modify and quality control the imported data while protecting original raw data
Stratigraphic modeling	• Define the vertical hierarchy of the geological layers • Create different models with varying resolutions using different interpretations
Fault modeling	• Define the group of faults to be used in the 3D model and solve possible inconsistencies among them • Create alternative models using different resolutions or using different interpretations
Structural modeling	• Define the structural framework for the 3D model by combining one stratigraphic model with one fault model • Create multiple scenarios to analyze alternate possible outcomes
3D gridding	• Create the 3D geo-cellular model from the structural model
Geomechanical properties	• Populate the 3D grid with rock properties interpolated from well data • Calculate the geomechanical properties
Fault and fracture stability	
Discrete analysis	• Calculate the fault slip and fracture opening potential of selected surfaces based on the stress state and fault and fracture properties • Perform uncertainty assessment to identify highest risk scenarios
Volume analysis	• Investigate the cap rock stability to reveal the proximity of high risk threats • Assess the risk of activating fractures and faults

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