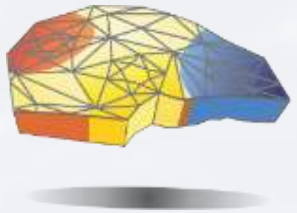
POLYKOD



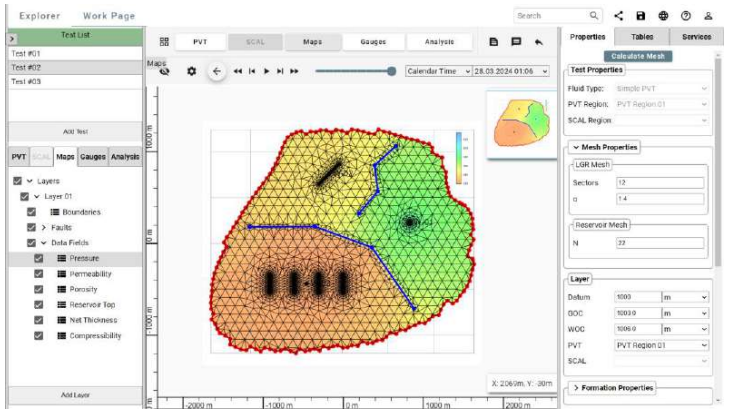
PolyGon

ABOUT THE PRODUCT

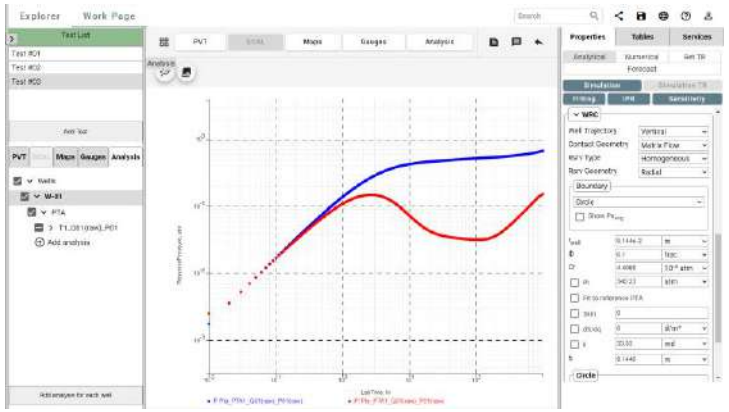
PolyGon

PolyGon is a Russian integrated software solution for analysis and interpretation of dynamic flow rate and pressure data during the development of oil and gas fields. It was developed under the state import substitution program for foreign software.

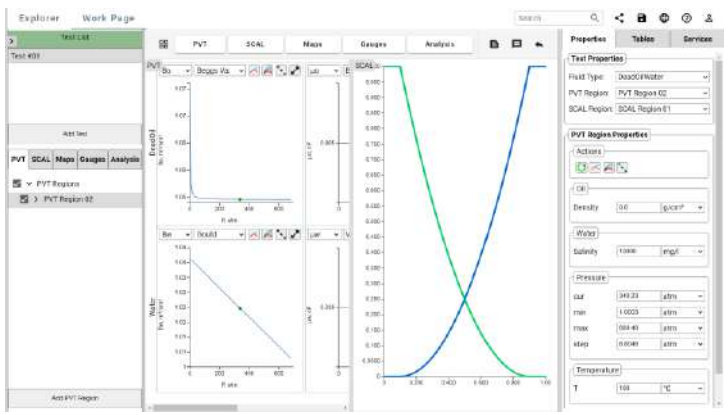
Multiphase 2D+ numerical modeling



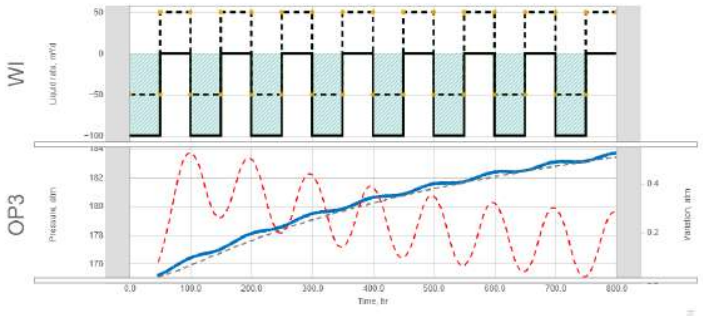
Analytical models and production data interpretation



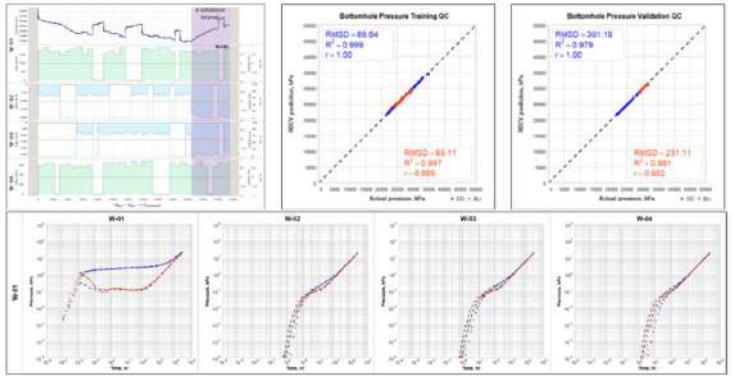
Fluid models and relative phase permeability



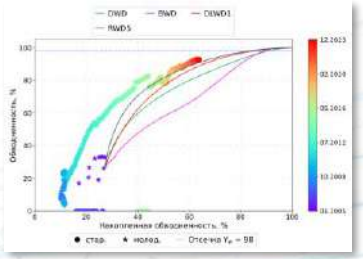
Pulse-code decomposition

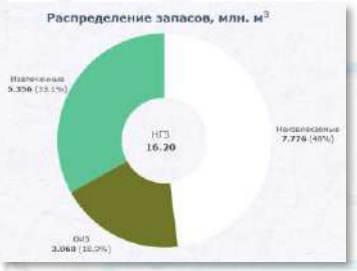


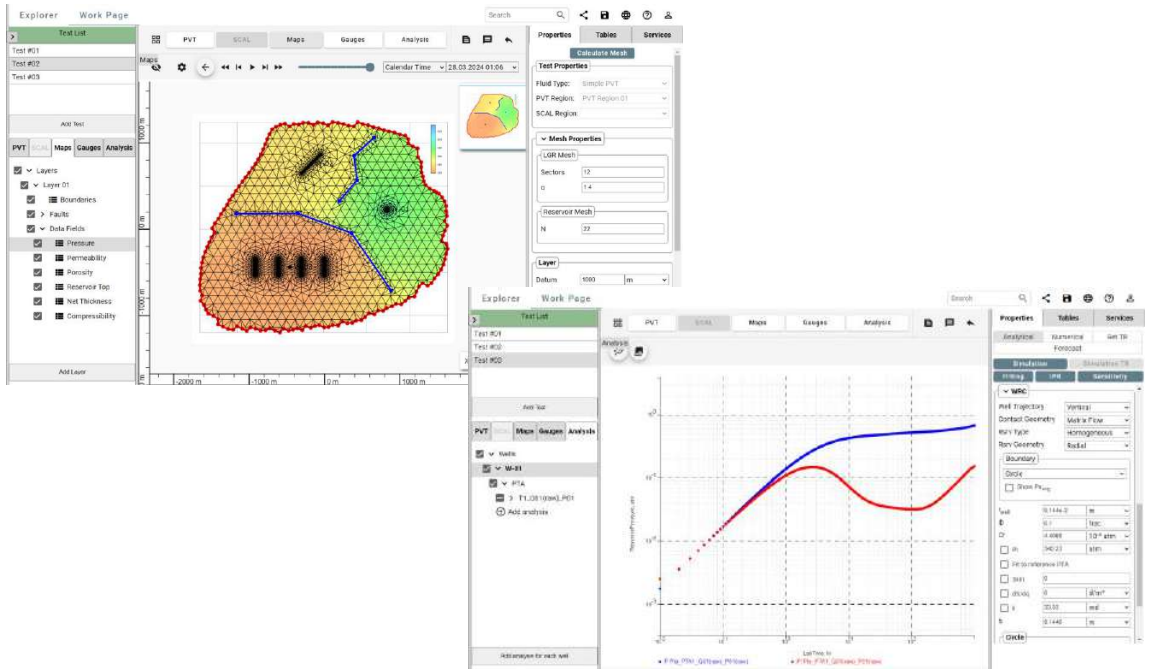
Multiwell deconvolution



Independent services/plugins







Brief Overview

PolyGon is a digital platform for analysis of flow rate and pressure data. Key features:

- PVT and SCAL models, production allocation maps
- Data processing;
- Single-well analysis of build-up tests (BHP), drawdown tests (DHP), production data analysis, deconvolution;
- Interwell interference analysis;
- Optimization of well operating regimes based on interwell interference;
- Management of project workflows within a secure corporate network.

Operating Platform

PolyGon implements the SaaS (Software-as-a-Service) concept and is compatible with all operating systems equipped with a web browser.

The user can access the service online (cloud version) or within a secure corporate network (on-premise version).

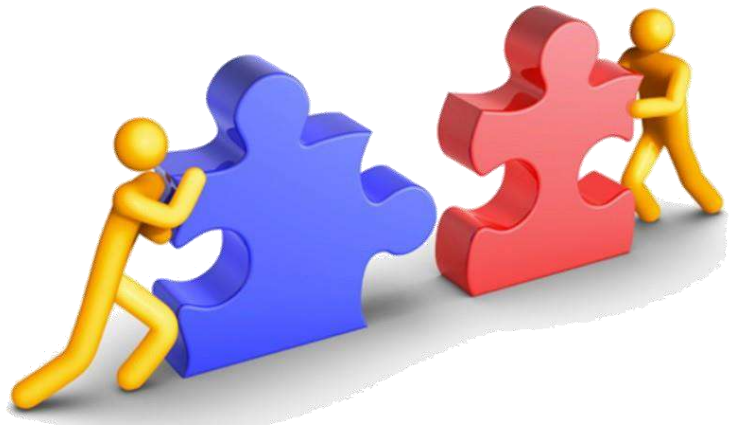
Remote Server

Application components operate within a microservices architecture. Computational processes are distributed across remote servers deployed on a high-performance multi-core workstation, enabling users to access their personal data in a secure format from anywhere in the world.

Data Security

User data is stored in an encrypted format and protected against failures through cloud backups. Communication between the client and the remote server is carried out using secure protocols and data encryption.

The software can also be deployed within the customer's internal network.



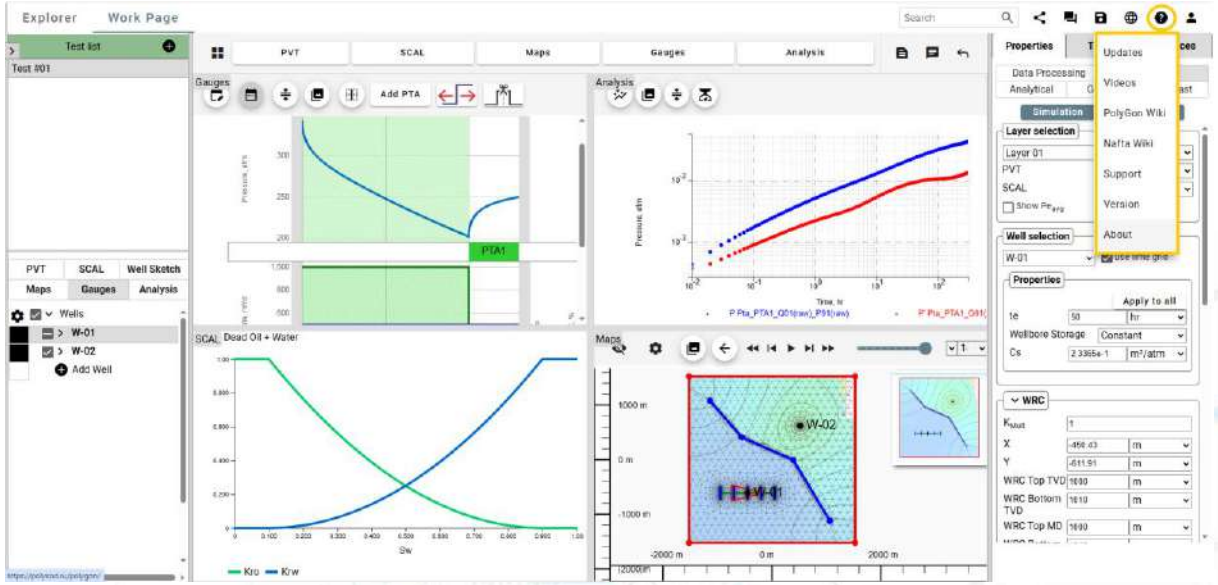
Collaborative Work

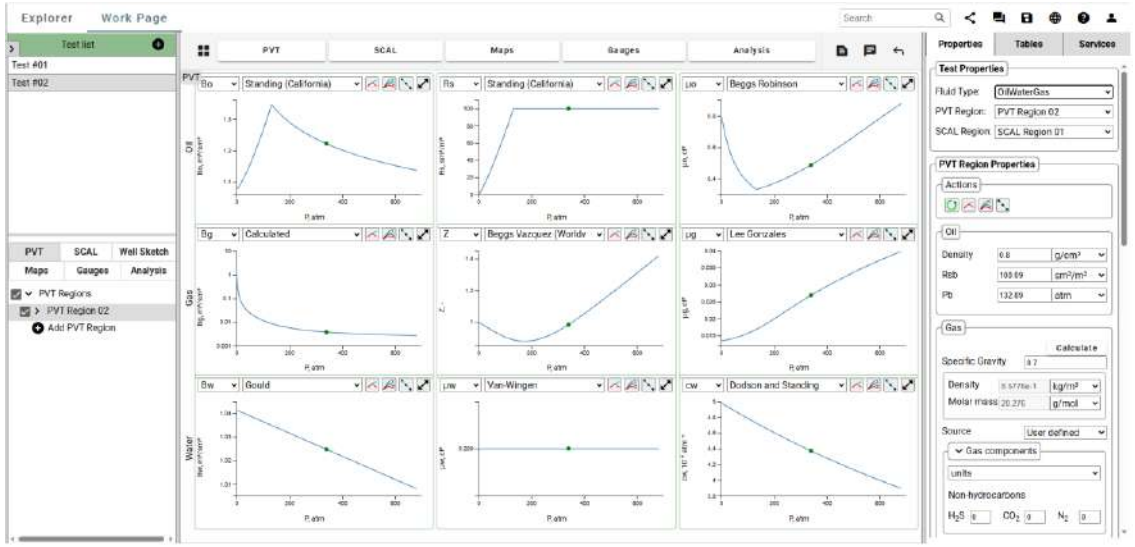
PolyGon users can collaborate on a single project:

- The project owner grants colleagues full access to the project with editing capabilities.
- The project owner shares a URL link to the project with another user in read-only mode. The other user saves a local copy of the project and gains full access to it.

User Interface

The user-friendly **PolyGon** interface provides intuitive perception and ease of interaction. Interface elements are equipped with contextual tooltips, and the help section includes links to training videos, a user manual, a product release notes list, and an online knowledge base in the field of petroleum engineering.





Fluid Properties

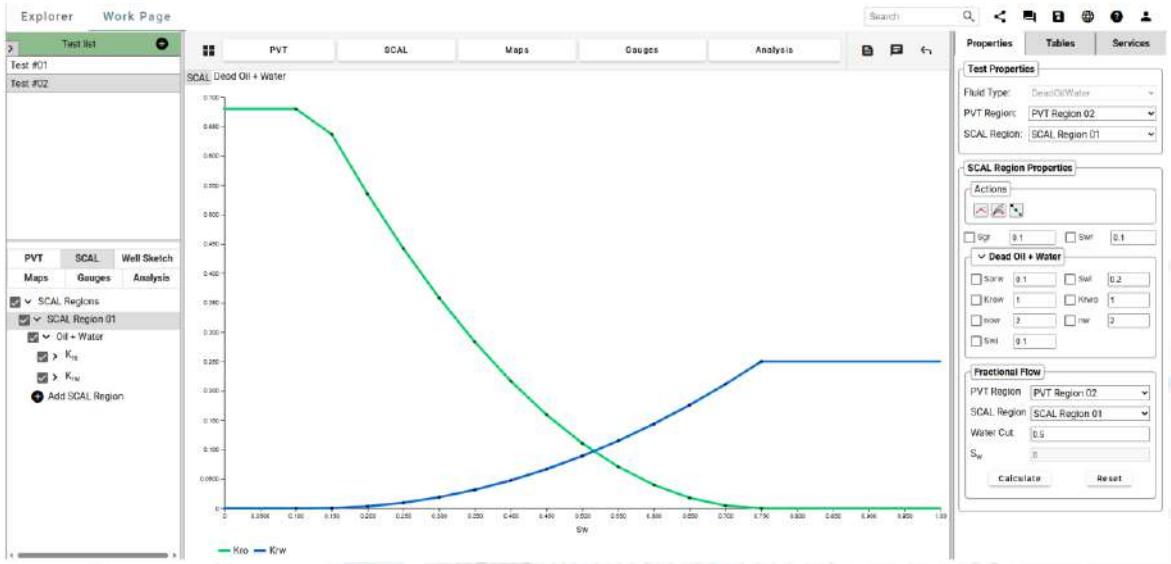
PolyGon supports a wide range of correlations for describing water and hydrocarbon phases: density, thermal expansion coefficient, gas-oil ratio, bubble point pressure, and viscosity, as well as:

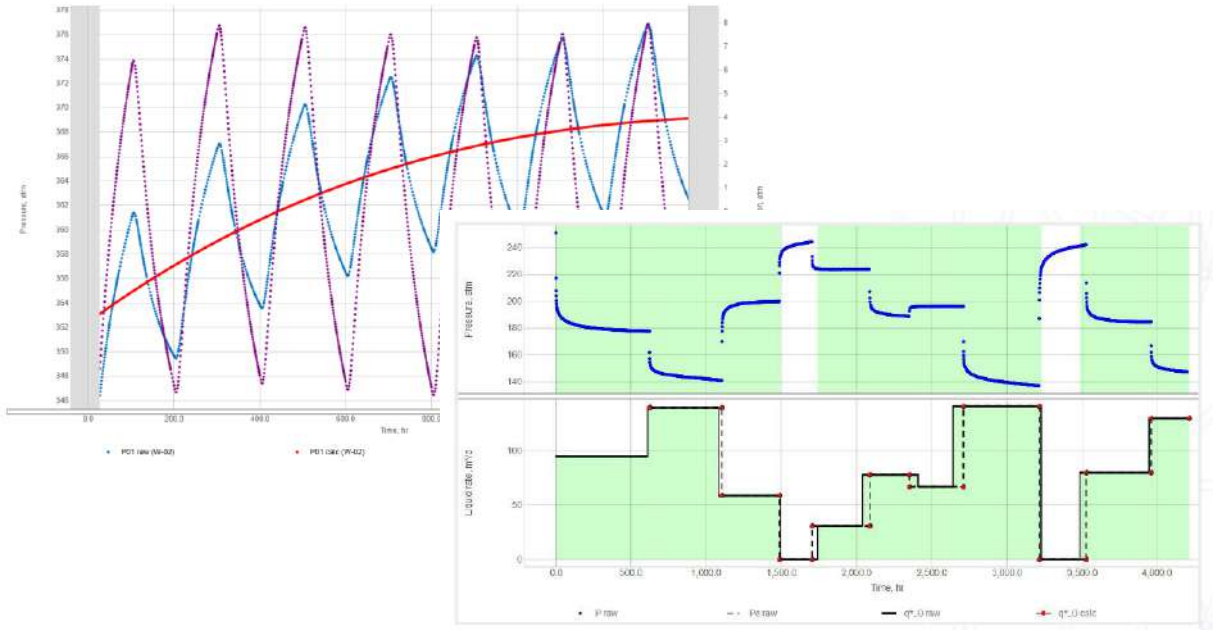
- supports multiple built-in PVT correlations;
- allows importing laboratory fluid study data in commonly used text formats;
- supports linear auto-calibration of built-in correlations to laboratory data.

Relative Permeability

PolyGon supports the Corey model for two-phase relative permeability and three-phase relative permeability based on the Stone and Baker models.

PolyGon enables automatic calibration of built-in correlations to user data.





Data Preprocessing

PolyGon provides a wide range of detrending and data filtering methods, including tidal noise removal.

The thinning module enables users to perform reduction of production and pressure data points with various options to control the process.

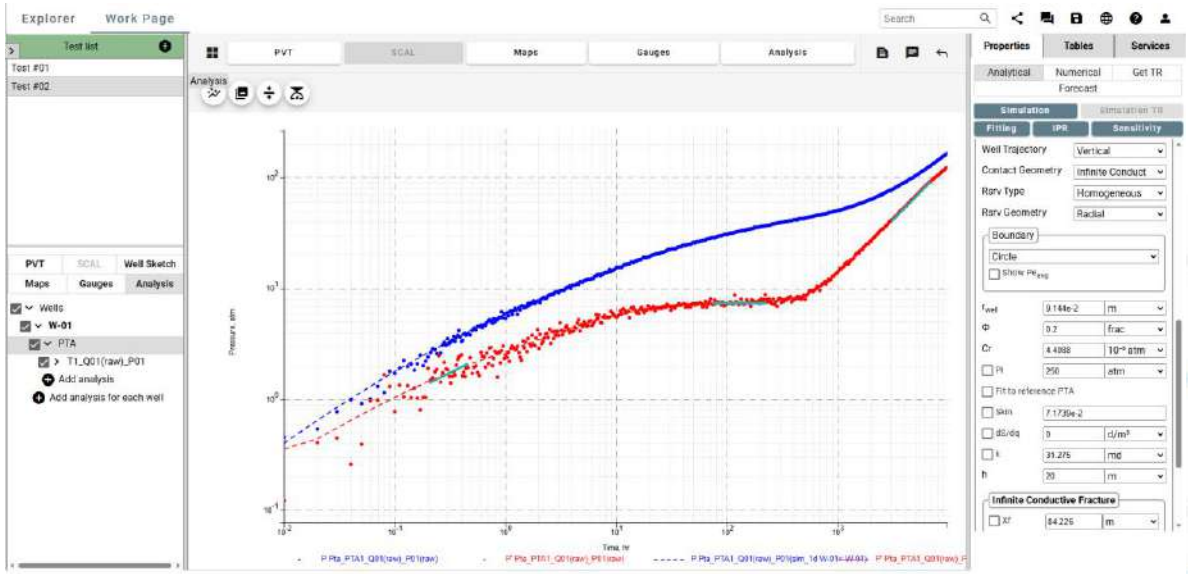
The transformation module allows applying arithmetic operations to data, as well as calculating the difference between two sensors.

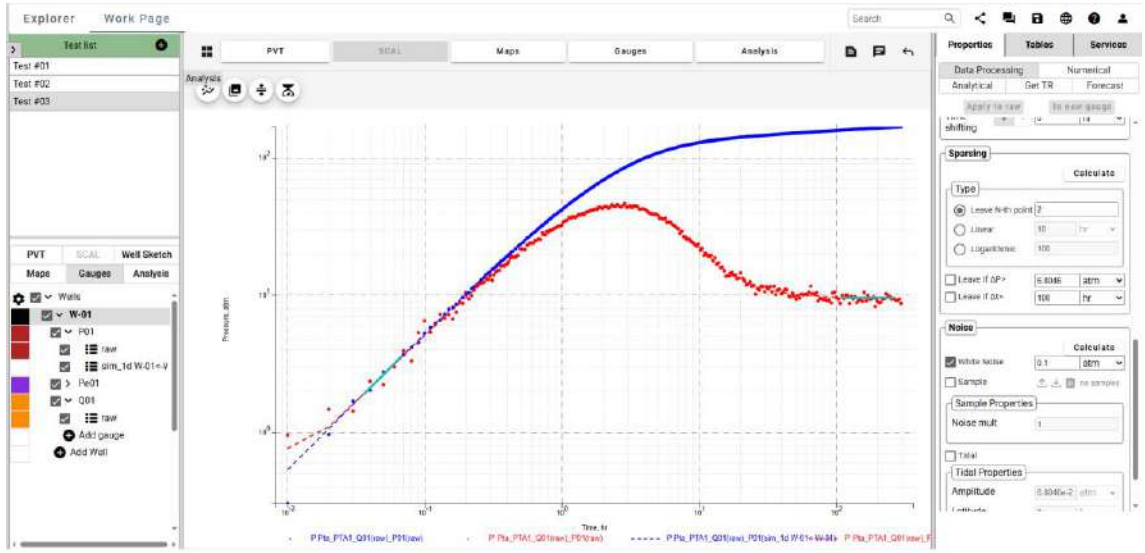
PolyGon supports both manual and automatic tools for flow rate and pressure synchronization.

Filtering Models

PolyGon supports a wide range of well test analysis models:

- wellbore storage effects: constant, variable;
- well: vertical, partially penetrating, deviated, hydraulically fractured, horizontal;
- reservoir: homogeneous, dual-porosity, two-layer, radial composite, linear composite;
- boundary: infinite-acting, closed, fault.





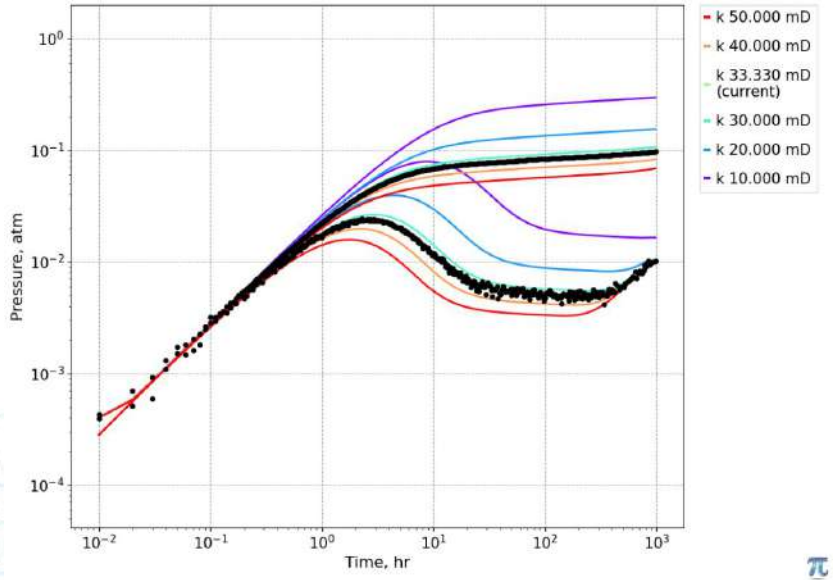
Build-up / Draw-down Analysis

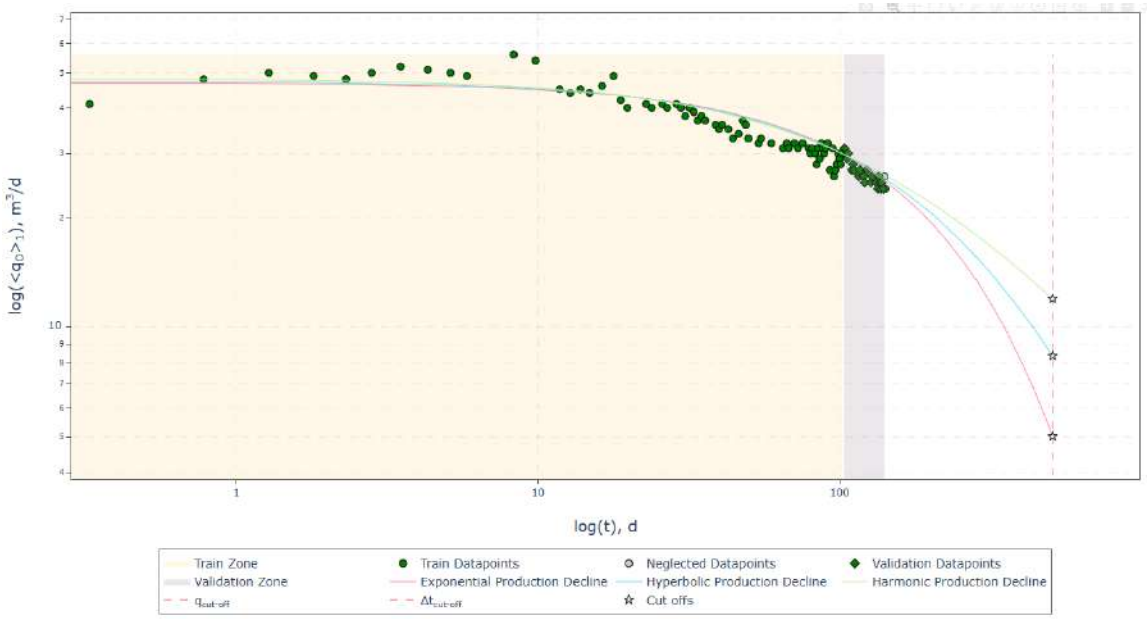
Standard build-up/draw-down analysis provides estimation of key “well–reservoir” system parameters:

- wellbore storage;
- skin factor;
- permeability;
- boundary type;
- distance to reservoir boundary.

Sensitivity Analysis

PolyGon provides the ability to evaluate the sensitivity of a specific diffusion model to variations in input parameters.



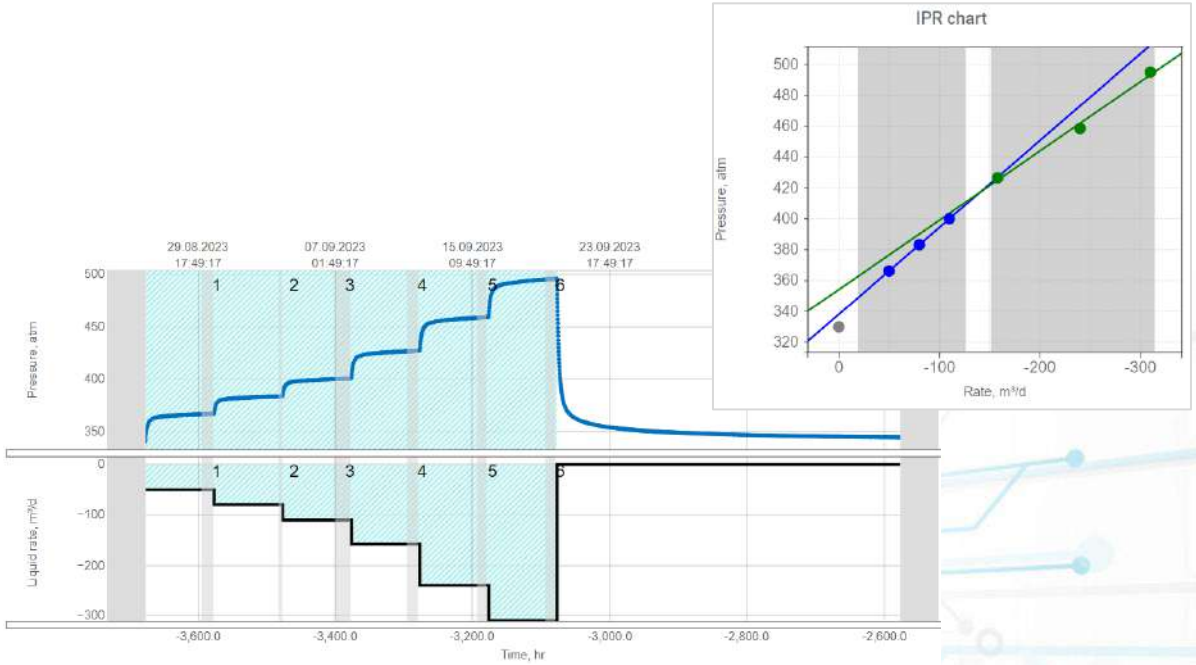


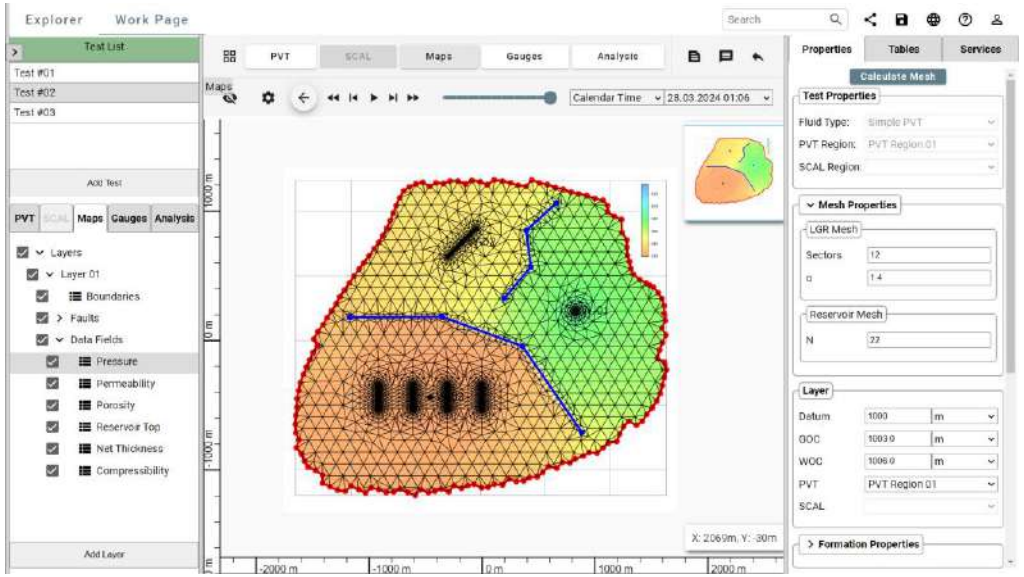
Production Decline Curve Analysis

PolyGon includes a plugin for production decline curve analysis based on Arps' decline models. The user can forecast production decline based on either a cutoff date or a limiting oil production rate.

Indicator Diagram Analysis

PolyGon provides a flexible tool for well test interpretation (GDIS) using the indicator diagram method for both production and injection wells, including cases with auto-hydraulic fracturing (auto-HF) effects.





2D+ Numerical Modeling

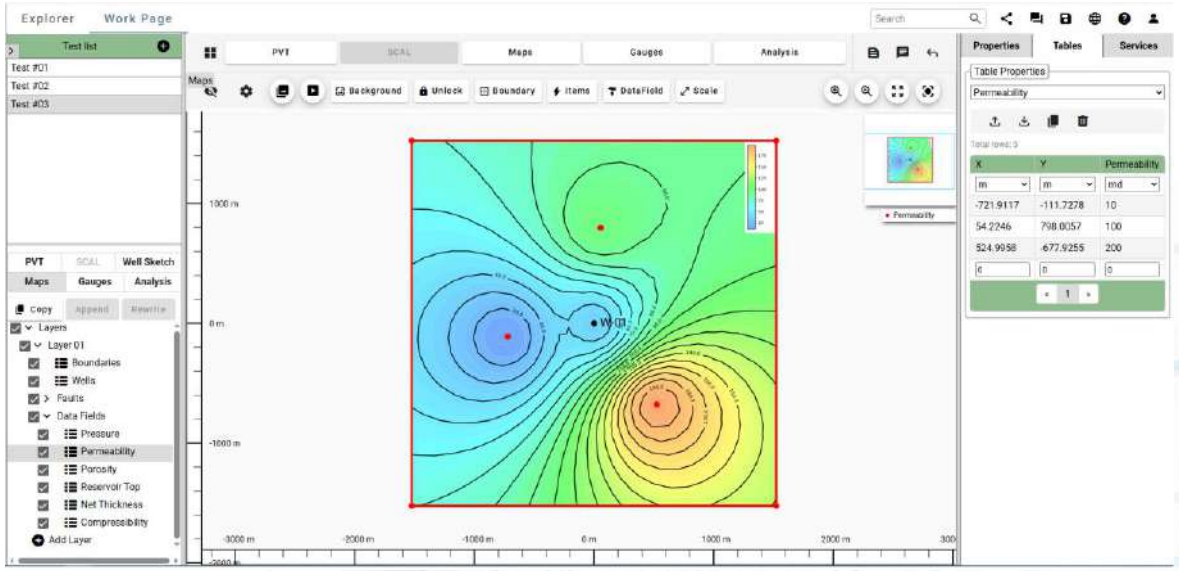
PolyGon implements a numerical simulator for pressure and production rate in multilayer systems on irregular grids. The simulator enables calculations under rate control, pressure control, or mixed constraints in single-layer or multilayer cases.

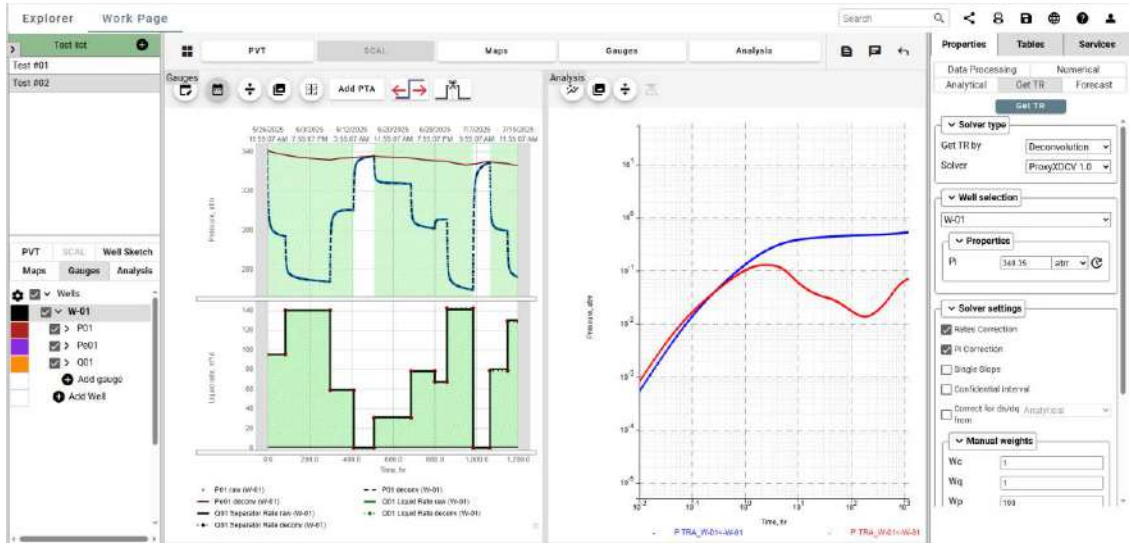
Numerical simulation accounts for fractures of arbitrary geometry, which may be partially or fully impermeable.

PolyGon supports advanced well completion models: VF HF, horizontal wells, multistage hydraulic fracturing.

Property Mapping Tool

PolyGon provides the capability to generate property maps by importing data fields from a file or defining them via the user interface. Contour lines can be added to property maps, with their number and style controlled by the user.





Single-well Deconvolution

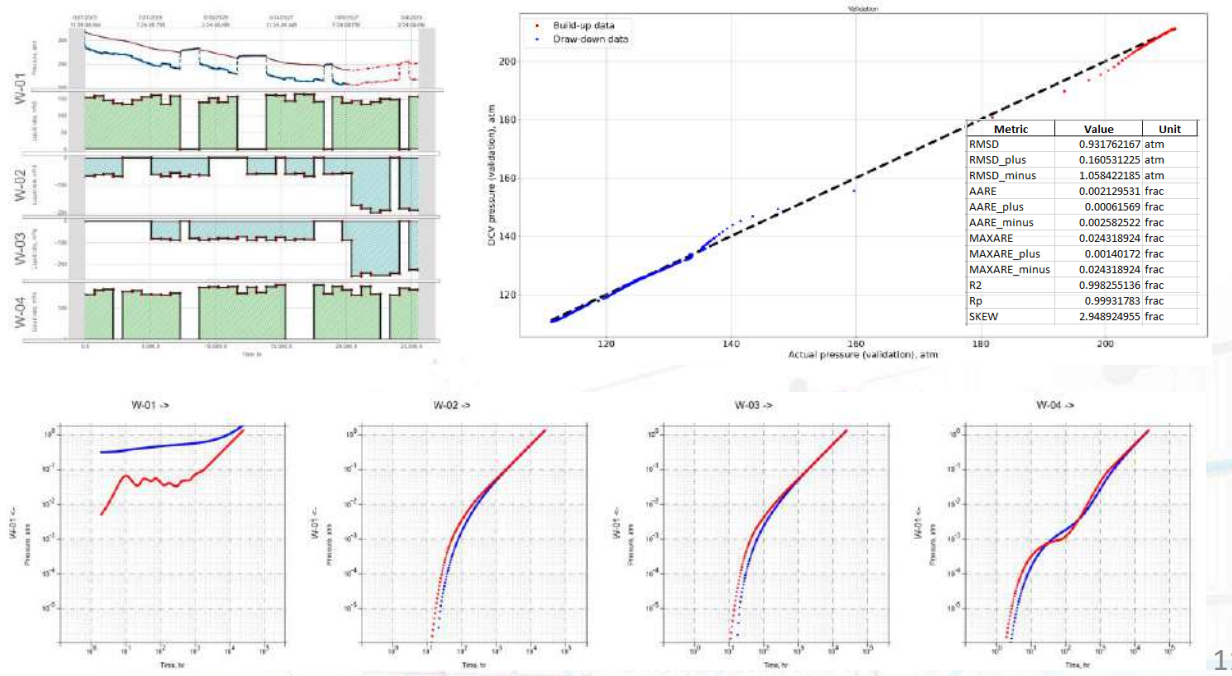
PolyGon supports a single-well deconvolution tool (SDCV) that calculates a transient response function from historical rate and pressure data, representing pressure response to a unit-rate input.

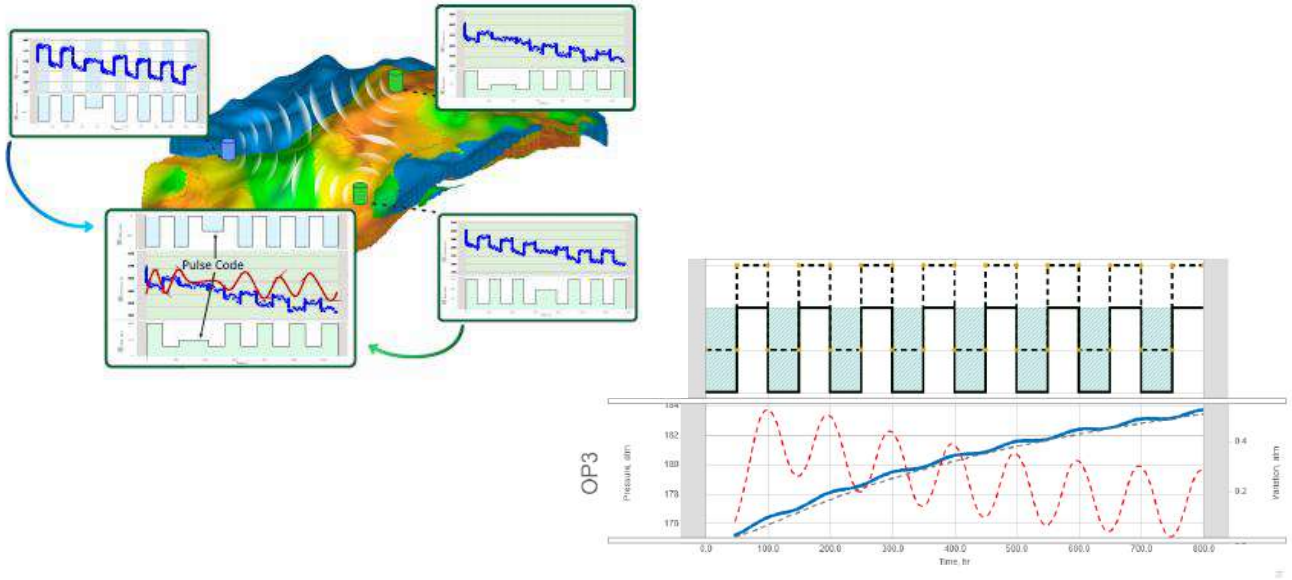
Single-well deconvolution algorithms enable extraction of information on reservoir pressure dynamics, reservoir properties, and near-wellbore zone characteristics.

Multiwell Deconvolution

PolyGon is equipped with a unique **MDCV** engine that enables derivation of transient unit-rate response functions for wells or interwell intervals.

These intervals can subsequently be interpreted using standard build-up/draw-down analysis (BHP/DHP), for example, to quantitatively estimate reservoir parameters in interwell zones, thereby providing additional control over the deconvolution process.





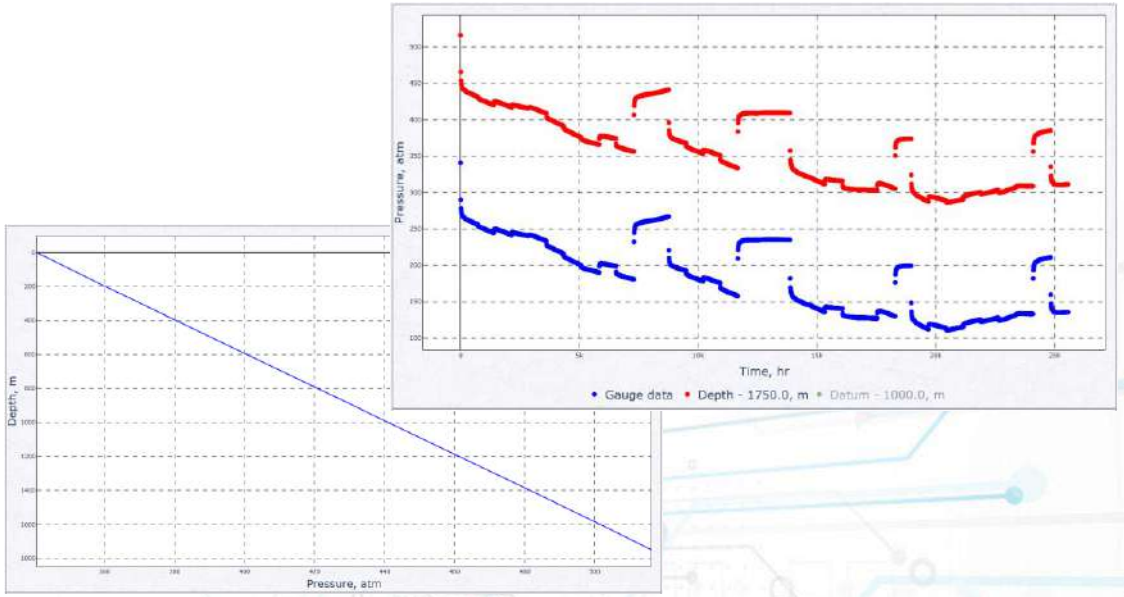
Pulse-code Decomposition

PolyGon provides a tool for modeling and automatic calibration of bottomhole pressure response from field data to specific rate variations in surrounding wells.

Pulse-code decomposition is a procedure for decomposing a complex pressure response at each well into components, each of which correlates only with the production history of a single influencing well.

Pressure Conversion To A Specified Depth

PolyGon provides the FLOSS utility for accurate conversion of well pressure to a specified depth, accounting for friction losses. The utility operates within a homogeneous flow model, enabling consideration of uniform phase mixing in multiphase conditions. This is a powerful tool for well pressure analysis and control, ensuring high accuracy and ease of use.



Chessboard Table Conversion

PolyGon platform includes the PolyParser tool for converting standard information and analytical tables (“chessboards”) into a vertical column format suitable for data import.

Conversion is performed in one click, significantly reducing the analyst’s time required for uploading raw data into PolyGon.

Both static “chessboards” with a fixed number of rows and dynamic ones with a variable number of rows are supported.

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