



Research Institute of Petroleum Industry
Faculty of Research and Development in Upstream Petroleum

PIA

Pars WellTest Analyser V.1.0

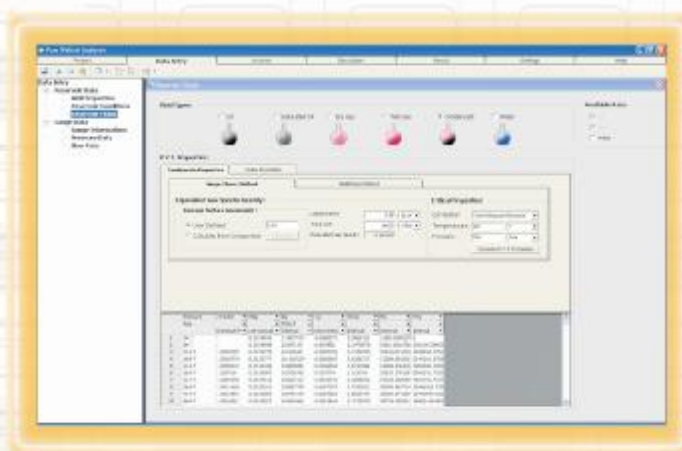
Main Features

- Quick and easy data entry
- Comprehensive correlation packages of rock & fluid properties
- Full set of diagnostic analysis tools
- Sensitivity analysis
- Test design
- Simultaneous view of multiple analysis
- Robust input data handling and import capability
- Fast and accurate results using a powerful optimization engine

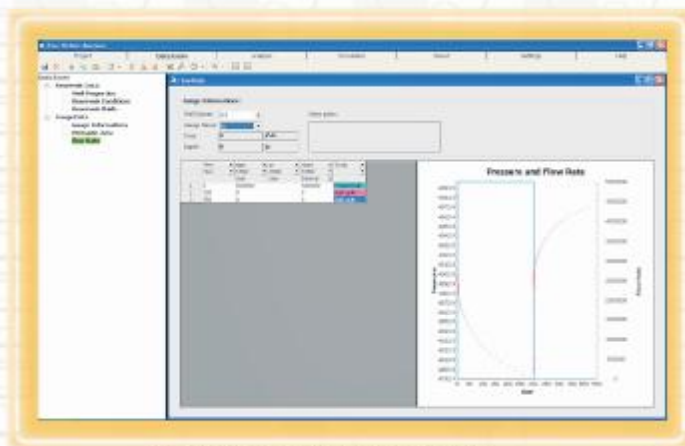
Pars Welltest Analyser™ is a comprehensive package for analysing and history matching transient well test data. The applied analytical methods in PWA and also numerical methods in our future development plan help engineers to interpret reservoir flow characteristics and predict future production based on well test analysis results. PWA's Powerful graphical user interface makes it easy for users to move around and assimilate the program options.

Data Entry and It's Dependant Calculation Section

- Well, Reservoir and Fluid Related Data
- Well Rate and Pressure Data from Guages



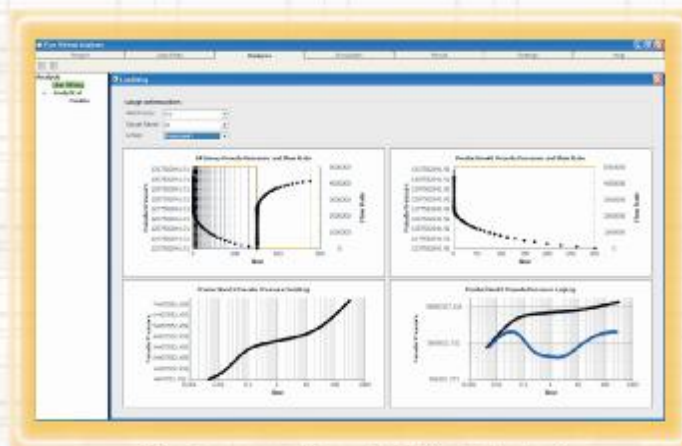
Fluid Properties Calculation Form (Data Entry Section)



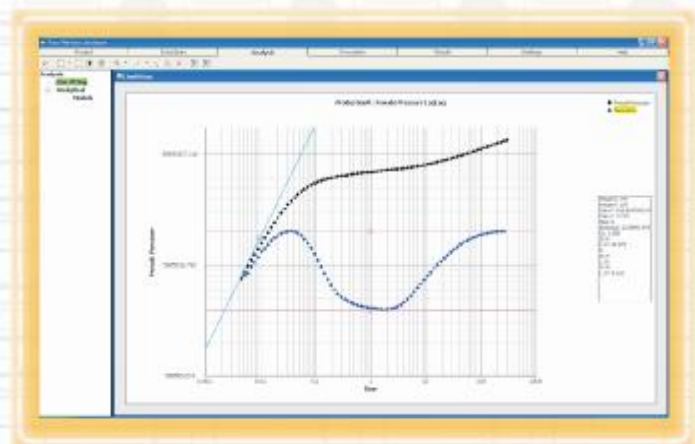
Flow Rate vs. Pressure Variation

Initial Estimation of Reservoir Parameters and Model Selection Section

- Line Fitting Analysis
- Model Identification



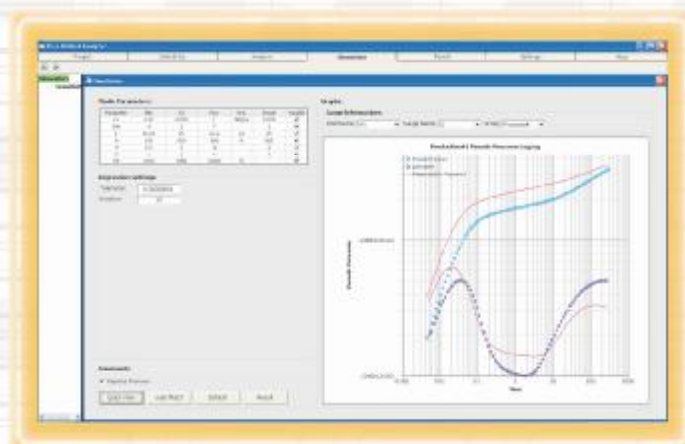
Simultaneous View of Multiple Analysis



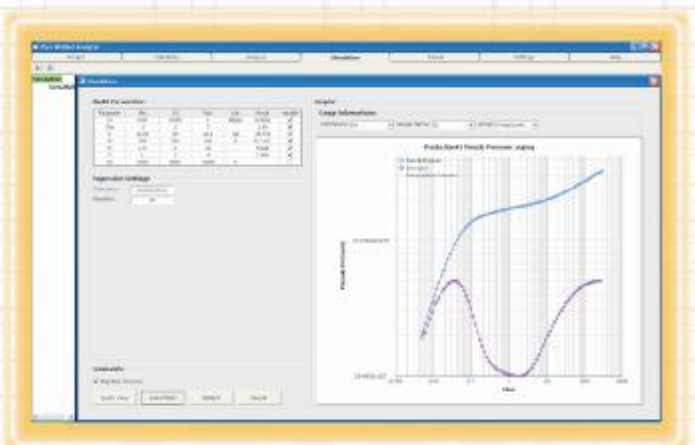
Line Fitting Analysis in Log-Log Plot

Optimization of Model Parameters Section

- Simulation and Nonlinear Regression
- Sensitivity Analysis



Log-Log Plot (Before Regression)



Log-Log Plot (After Regression)



Sensitivity Analysis Plot

Levenberg-Marquardt algorithm is used to optimize the model parameters. This method combines advantages of two well known optimization methods; Such that it inherits its operating stability from the steepest descent method, and adopts its accelerated convergence in the minimum vicinity, from the Newton method. In order to improve optimizer performance, secant update idea is used instead of recalculating Jacobian using numerical differentiation. This idea has reduced optimization time tremendously.



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