



Pars Asphaltene Precipitation Simulator

PAPsim

Main Features

- Using commercial PVT models for oil and gas phase behavior
- Asphaltene phase behavior based on polymer solution theory (MMFH, MFH)
- Simulation of asphaltene precipitation in natural depletion and fluid injection processes
- Sensitivity analysis on temperature, pressure and composition effects on asphaltene precipitation
- Automated matching of asphaltene models using experimental data
- Powerful PVT, asphaltene and optimization engines
- Fast, robust and accurate results

PAPsim



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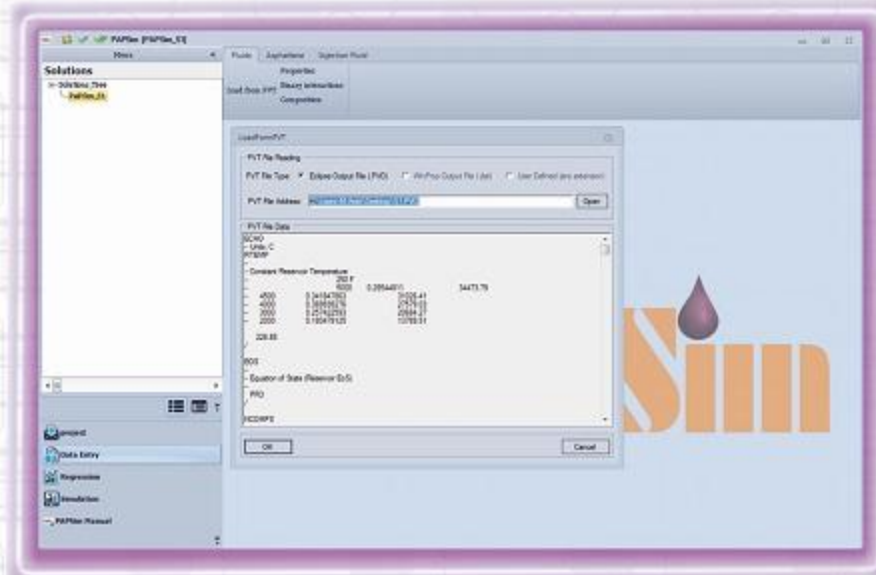


Research Institute Of
Petroleum Industry

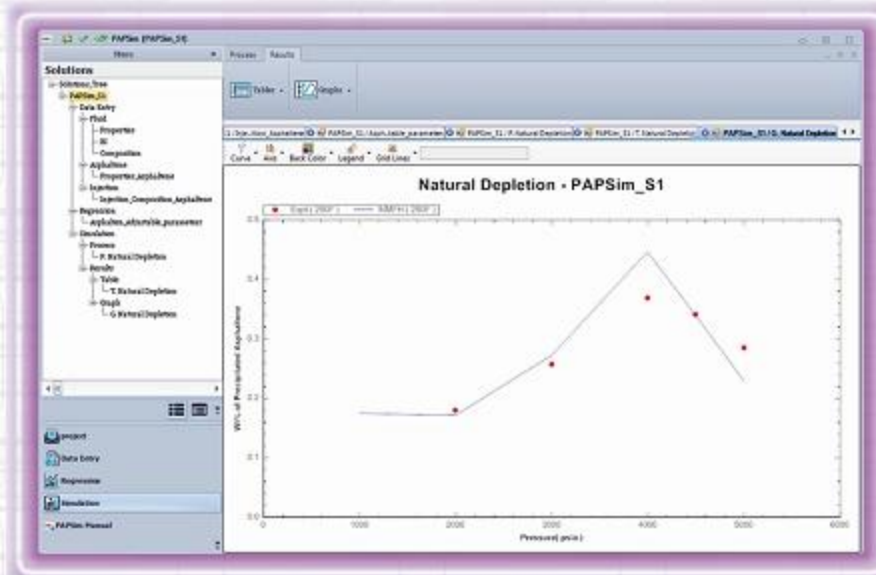




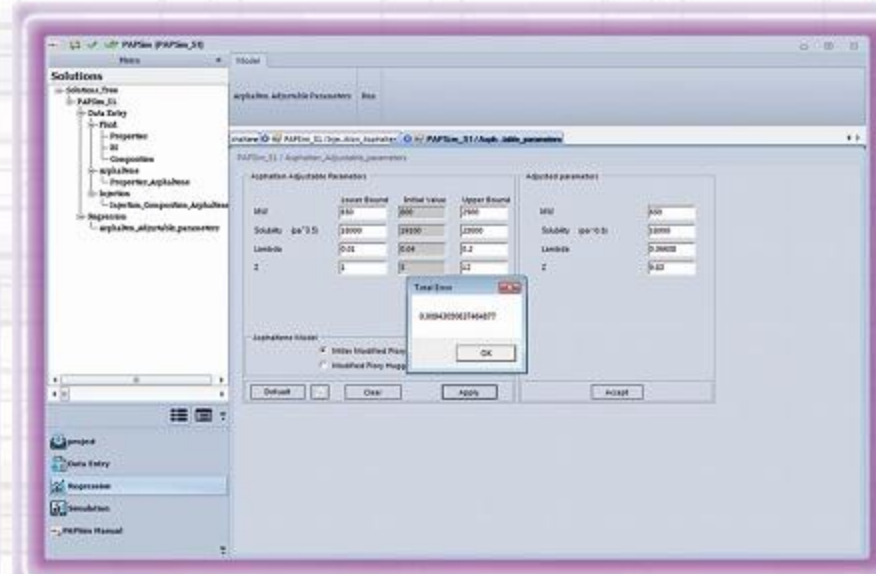
PAPSim[™] is a comprehensive package for simulating asphaltene precipitation in oil industry. Based on the *PAPSim*[™] inbuilt engines in PVT, asphaltene and optimizer modules, *PAPSim*[™] can simulate asphaltene precipitation in natural depletion and fluid injection processes. In addition, the effects of temperature, pressure and composition changes on the asphaltene precipitation can be simulated in *PAPSim*[™]. Oil and gas phase behaviors are modeled by a powerful compositional CEOS based engine. The asphaltene phase behavior is simulated by two polymer solution models, MMFH and MFH in *PAPSim*[™]. Simulated annealing procedure is used in non-linear regression to adjust asphaltene model parameters with experimental data.



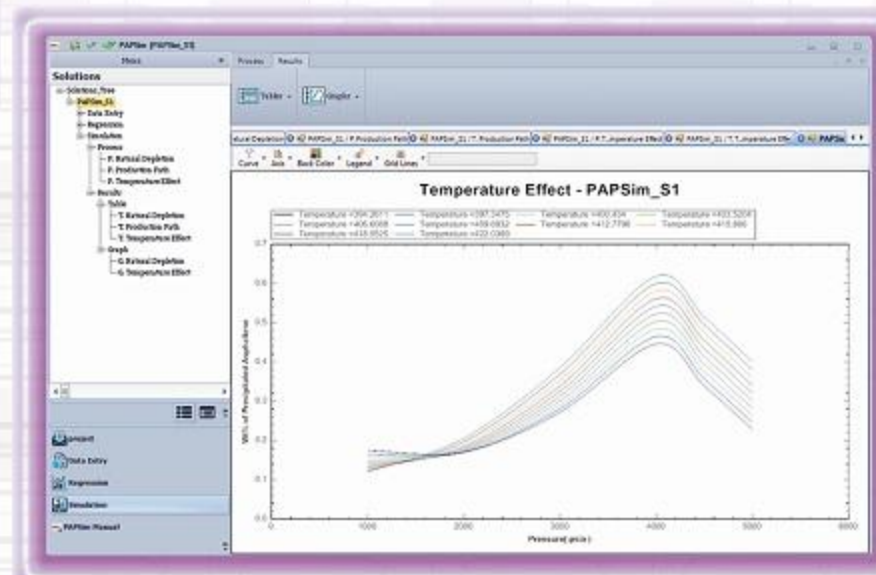
Loading the PVT file from commercial PVT softwares



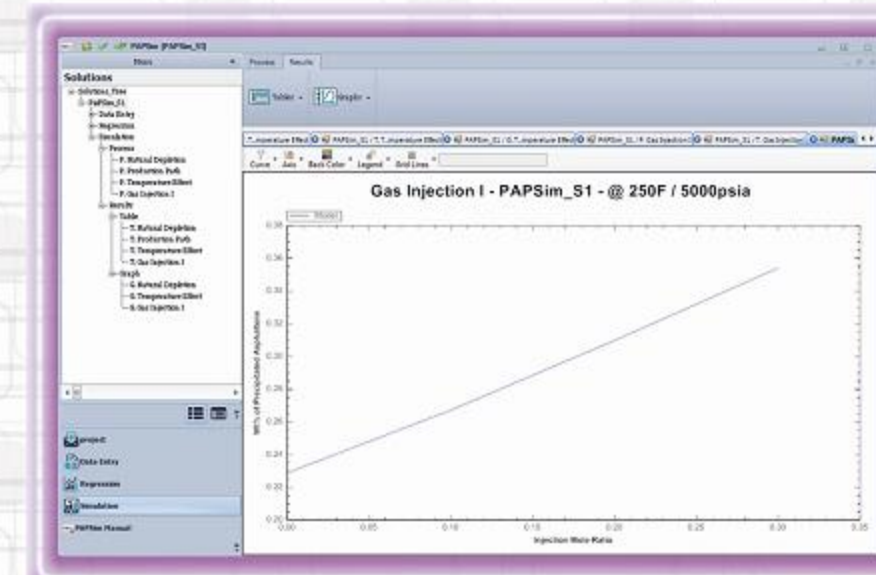
Comparison of the results of PAPSIm[™] and experimental data in natural depletion process



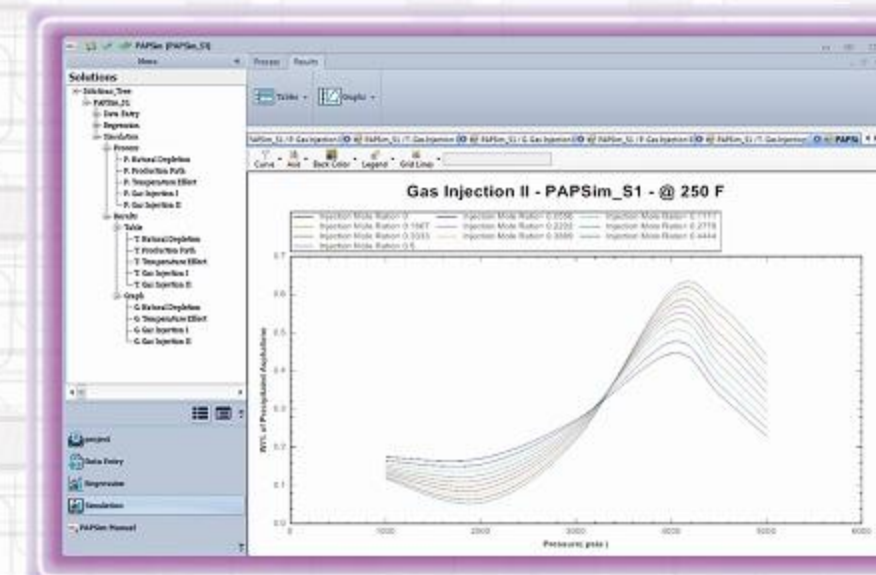
Tuning the Asphaltene Adjustable Parameters



Simulation of temperature/pressure effect on asphaltene precipitation



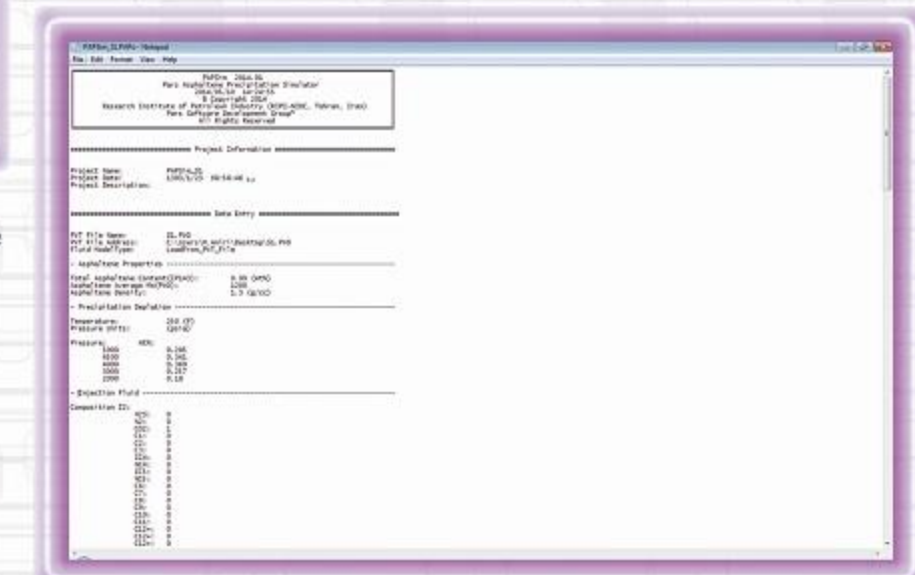
Simulation of CO2 injection effect on asphaltene precipitation at reservoir condition



Simulation of CO2 injection/pressure effect on asphaltene precipitation at reservoir temperature

Pressure	Wt% D	Wt% S	Wt% D	Wt% S	Wt% D	Wt% S	Wt% D	Wt% S
4000	0.2285	0.2407	0.2759	0.2951	0.3288	0.3499	0.3889	0.4121
4000	0.2285	0.2407	0.2759	0.2951	0.3288	0.3499	0.3889	0.4121
4000	0.2285	0.2407	0.2759	0.2951	0.3288	0.3499	0.3889	0.4121
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4000	0.2285	0.2407	0.2759	0.2951	0.3288	0.3499	0.3889	0.4121

Simulation of CO2 injection effect on asphaltene precipitation at reservoir condition (Tabulated outputs)



PAPSIm[™] output file

Based on the adjusted parameters of the asphaltene models, *PAPSim*[™] is able to simulate precipitation in natural depletion and injection processes (natural gas, non-hydrocarbon pure gases, solvent and blending); In addition the sensitivity analysis can be performed on simultaneous temperature, pressure and composition changes. The good simulation results of the *PAPSim*[™] are indebted to accuracy, robustness and stability of the used engines in the *PAPSim*[™].