FEFLOW

All-in-one groundwater modelling solution

Groundwater projects are becoming more and more demanding - requiring modelling software with more sophisticated capabilities than ever before. FEFLOW provides best-in-class technology for groundwater flow, contaminant, groundwater age and heat transport simulations. With its efficient user interface and its yet unmatched range of functionality and flexibility, FEFLOW has become a standard in premium groundwater modelling over the last 35 years.

APPLICATIONS

FEFLOW is applicable for a multitude of groundwater, porous media and heat transport projects - from local to regional scale.

TYPICAL APPLICATIONS

FEFLOW is the ideal software for:

- Regional groundwater management
- Groundwater management in construction and tunnelling
- Capture zone and risk assessment via groundwater-age calculation
- Mine water management
- Simulation of open-pit progress
- Saltwater intrusion
- Brine management (injection)
- Seepage through dams and levees
- Land use and climate change scenarios
- Groundwater remediation and natural attenuation
- Geothermal energy (deep and near surface, both open-loop and closed-loop systems)
- Groundwater-surface water interaction
- Groundwater induced subsidence
- Simulation of industrial porous media

FINITE ELEMENTS

FEFLOW uses a finite element solution to handle a broad variety of physical processes for subsurface flow and transport modelling. The advantages of the finite element method include:

- Flexible meshing for detailed models of complex geological structures
- Layer-based, partially unstructured or fully unstructured (tetrahedral) meshes in 3D
- Precise spatial representation of features, such as rivers, fractures, pipes, tunnels and well locations
- Accurate representation of sloping layers and anisotropy

FEFLOW supports dynamic deactivation and reactivation of mesh elements to account for geometry changes in the model domain over time.

3D groundwater models are computationally demanding. FEFLOW employs optimised numerical solvers that use parallel computing on multiprocessor and multicore machines.

The highly non-linear Richards equation is further stabilised using the Control-Volume Finite Element method.

FEATURES

FEFLOW supports a wide range of physical processes.

GENERAL

- Transient conditions
- Steady state conditions

FLOW MODELLING

- Darcy flow in porous media
- 2D/3D unsaturated flow
- Free surface (phreatic) flow
- Density dependent flow
- Fracture and pipe flow

MASS TRANSPORT MODELLING

- Advection-diffusion/dispersion solute transport
- Single and multispecies solute transport
- Equilibrium sorption
- User-defined kinetic reactions
- Fracture mass transport
- Geochemical and equilibrium reactions with PHREEQC-RM

GROUNDWATER AGE MODELLING

- Mean groundwater age calculation
- Capture zone analysis

HEAT TRANSPORT MODELLING

- Advection-conduction/dispersion heat transport
- Fracture heat transport
- Thermohaline convection
- 1D borehole heat exchanger elements and heat exchanger arrays

GROUNDWATER-SURFACE WATER INTERACTION

- Integrated dynamic river flow modelling linked to MIKE 11, the world-renowned predecessor of MIKE HYDRO River
- Integrated fully dynamic 2D surface water overland modelling linked to MIKE 21 Flexible-Mesh engine
FEATURES

ONE FOR ALL
Whether you are interested in regional groundwater flow around a water supply well or formation of temperature and salinity induced convection in a coastal aquifer, FEFLOW provides everything you need.

If your project requires accurate representation of the geology through flexible mesh modelling - even with time varying geometries - FEFLOW is the answer.

FEFLOW covers everything from the first pre-processing steps, to helping you present results to clients or to the public.

UP-TO-DATE VISUALISATION TOOLS
FEFLOW dramatically visualises planar, cross-sectional and 3D structures so you can present your modelling results as high quality snapshots or in video sequences.

Stereoscopic visualisation and image/video export provide a level of insight into complex simulation models that has never been reached before.

FEFLOW even exploits 3D Virtual Reality technology so you can dive inside your mesh to access its secret regions!

OPEN PROGRAMMING INTERFACE
FEFLOW is designed to handle plug-ins for extended functionality. A convenient programming interface makes plug-in development a manageable task - even for less experienced programmers. FEFLOW also offers Python interfacing to automate nearly all modelling tasks. Plus, it includes extensive documentation to help you get started.

GET THE FREE VIEWER
In viewer mode, FEFLOW’s advanced visualisation and post-processing capabilities are available free of charge. Model reviewers and clients do not need a software licence to evaluate input data and simulation results.

FEPEST FOR PEST
FePEST is FEFLOW’s graphical user interface for PEST developed by John Doherty. The convenient graphical interface of FePEST guides you through all steps of parameter estimation, sensitivity analysis, uncertainty analysis and Monte Carlo based uncertainty quantification. For increased efficiency, these tasks can be executed in parallel on multiple cores, multiple computers or even in the cloud - with just one single Professional licence.

WGEO
WGEO is an outstanding tool for georeferencing and processing of spatially related raster data, as well as for transforming raster and vector data. WGEO enables quick and efficient rectification and georeferencing of data sets for use in simulations.

FEATURES

OUTSTANDING TRADITION
Since 1979, FEFLOW has been the trusted choice of leading groundwater modellers worldwide. It has been applied to different types of groundwater and porous media simulation projects and constantly developed including the introduction of a convenient graphical user interface in the late 1980s.

BENCHMARK SIMULATIONS
Users of complex simulation software, such as FEFLOW, expect reliability, accuracy and efficiency.

All parts of the FEFLOW simulation engine have passed extensive benchmark testing against analytical solutions, physical laboratory tests and results from other well-known simulation systems.

Thousands of users around the world know that highly-qualified support for complex groundwater modelling is only an email or a phone call away.

The very active FEFLOW user community shares application experience via the MIKE User Forum and other online groups. Check out these platforms - even if you are not a FEFLOW user yet.

Regular user group meetings and FEFLOW conferences also provide opportunities to share knowledge and connect to the global community of FEFLOW users.

Contact: mike@dhigroup.com
For more information, visit: www.mikepoweredbydhi.com